

**SAFIT**

**List of Macroinvertebrate Taxa from California and Adjacent States and  
Ecoregions; and Standard Taxonomic Effort**

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(First circulating draft)**

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## **Introduction**

The Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT) is charged through its charter to develop standardized levels for the taxonomic identification of aquatic macroinvertebrates in support of bioassessment efforts. This document defines the standard level of taxonomic effort (STE) for bioassessment projects using the California State Bioassessment Procedure (CSBP) or similar procedures based on our current understanding of macroinvertebrate taxonomy, as detailed in the STE Rules (Rogers & Richards, 2006). This list includes aquatic taxa found in streams and lakes primarily in California as well as surrounding states and ecoregions. Specialized references are suggested for particular taxa. For the latest version of the STE document and for other Bioassessment resources, visit the link on the California Aquatic Bioassessment Workgroup (CABW) website ([www.dfg.ca.gov/cabw/cabwhome.html](http://www.dfg.ca.gov/cabw/cabwhome.html)). At present, the link is under the heading “CAMLnet”.

This STE list should not be interpreted as a comprehensive list of the aquatic macroinvertebrate fauna of the southwestern United States, although such a list is being developed. This STE list includes the macroinvertebrate taxa encountered in bioassessment samples as of the date of this revision, together with literature records from published taxonomic monographs. The higher level taxa in this list (Phylum through Order) are organized hierarchically to reflect phylogenetic relationships, while Family through Species are listed alphabetically. The higher taxonomy of the Arthropoda is currently a subject of debate. Therefore, for this version of the STE List we have maintained a more traditional presentation of the superordinal tiers of the Arthropoda.

Several modifications have been made subsequent to the previous STE list (revision 27 January 2003) including habitat information (benthic, lotic vs. lentic and estuarine habitats), and distribution information for California and surrounding states. For many groups, this information is preliminary and is meant as supplemental to the taxonomic information given for each group. The tolerance values and functional feeding group information has been removed from this document. Plans are underway to revise much of this work and include the information in a separate document or in the California Ecological Data Application System (CalEDAS). Any suggestions for modifications of this list should comply with the STE Rules, and be sent to the attention of Austin Brady Richards, CDFG Aquatic Bioassessment Laboratory ([arichards@csuchico.edu](mailto:arichards@csuchico.edu)) or D. Christopher Rogers, EcoAnalysts, Inc. ([crogers@ecoanalysts.com](mailto:crogers@ecoanalysts.com)) or any member of SAFIT’s Standard Taxonomic Effort committee (see STE Rules, sections 2.2 and 2.6).

## **Standard Taxonomic Effort**

The goal of this document is to standardize levels of taxonomic effort among labs conducting the CSBP or similar protocols. For benthic macroinvertebrate (BMI) datasets to be compatible, taxa need to be identified to a common, reproducible level, thus SAFIT defines levels of taxonomic resolution for all labs performing the CSBP; i.e. the standard taxonomic effort or STE.

## **Rules for Developing a Standard Taxonomic Effort**

During the recent reorganization of CAMLnet into SAFIT, a discussion was started among participating members of the group concerning the validity of taxonomic names used in bioassessment. This discussion led to the drafting of the first version of a rules document to accompany the STE (Rogers and Richards, 2006, herein after referred to as the STE Rules). This document is a guide to the validity of taxonomic names and provisional taxa, their use and reporting format in bioassessment datasets. The STE Rules document also outlines the procedures and criteria for subsequent revisions of the STE list with the proposed formation of an oversight committee for the STE.

## **The SAFIT Standard Taxonomic List**

A practical level of standard effort is determined by cost-effectiveness of identification relative to effort. Obviously, cost-effectiveness is highly dependent on taxonomic skills, but it is also determined by the availability of accurate keys and peer reviewed literature, and the degree of special methodology (e.g. slide mounting) needed to identify taxa.

Some Bioassessment programs use the availability of species keys to establish standard levels of effort, and for some taxonomic groups we do provide references to species keys where they exist and if they meet the requirements of the STE Rules. However, in the CSBP, the objective is to identify all taxa to an even level of taxonomic effort. At the time of the previous revision of this list, two levels of standard effort were defined. Level I corresponds to genus level identifications for all groups (where possible) except for the Chironomidae which are taken only to family and monotypic taxa which may be taken to species. Level II corresponds to species level identifications for all groups (where possible) and genus level identification for the Chironomidae. Taxonomic levels of effort (and exceptions) are listed for each group.

## **Habitat Information**

The primary focus of this list is benthic macroinvertebrates. A few non-benthic taxa have been included but are marked as such. In future versions of this list, it is hoped that guidance on the taxonomy of all aquatic and semiaquatic invertebrates can be included. Another change from the previous revision of this list is the specific inclusion of lotic, lentic and estuarine habitats. This section is still under construction and will be fleshed out in subsequent revisions. It should be pointed out that certain aquatic species (particularly adult Gyrinidae and Dytiscidae) which are considered to be lentic may also occur in streams in slow-moving or slack water situations.

## **Geographic Scope**

The STE began as a guidance document for California only. As the California Aquatic Macroinvertebrate Laboratory Network (CAMLNet) has evolved into SAFIT, the area of coverage has increased to include the Southwest in general. The STE has been expanded to include California and adjacent states. Washington was also included since many

aquatic invertebrates have distributions ranging from California to Washington in the Cascade and Coastal Ranges. Some information has been given for distributions in Baja California as well. It is hoped that future revisions of this list will flesh out these distributions and add other sections of the southwest. All distribution information has been gathered from other sources. Thus, this list is not meant to be a checklist for any of the groups therein, but simply as a guide to distributional information and should not be taken as published data by itself. We should also stress that identifications should not be based solely on distribution.

### **Abbreviations in the STE list**

CA=California, OR=Oregon, WA=Washington, NV=Nevada, AZ=Arizona, Baja=Baja California (at present this term doesn't distinguish between Baja California Norte and Baja California Sur); "X"=published distributional or habitat records, "?" unpublished, but known distributional or habitat records.

### **Life Stages**

The information in the STE list primarily deals with those life stages of invertebrates that are aquatic. Some additional information is given for the terrestrial life stages. The term "larva" (plural: larvae) has historically been applied only to the immature, pre-pupal stage of holometabolous insects. However, in recent years, the term larva has also been applied to the immature or "nymph" stage of hemimetabolous insects. Both terms may appear in this document, although the compilers of this present edition prefer to reserve the name nymph for the immatures of hemimetabolous insect orders (Ephemeroptera, Odonata, Plecoptera, Hemiptera) and use the name larva in association with the holometabolous orders (Megaloptera, Trichoptera, Lepidoptera, Coleoptera, Diptera).

### **Rare, Threatened and Endangered Species**

Rare, threatened and endangered species are defined to include aquatic macroinvertebrate species listed as threatened or endangered under the federal Endangered Species Act (ESA) (50 CFR 17.11 for listed animals and various Federal Register notices for proposed species), the California Endangered Species Act (CESA), and the California Environmental Quality Act (CEQA). This does not cover aquatic macroinvertebrate species listed under state law in adjacent states. Rare, threatened and endangered species are afforded various levels of protection under the aforementioned laws. Any individual, private company or agency that violates these laws may be subject to substantial fines, imprisonment, or both. Inclusion of names of rare, threatened and endangered aquatic macroinvertebrates in this document and the STE list is meant to be strictly informative and in no way authorizes collecting or harming these taxa without proper permits.

Rare species are species that may be given some protection under CEQA depending upon the action being reviewed under a specific CEQA document. These species typically are not protected, however they may at any time become listed under CESA or ESA.

Threatened species are species that are partially protected under CESA and ESA. While it is illegal to collect, harm, harass, or kill threatened species, some activities may still be legal (varying depending on the species) without the requirement of permits.

Endangered species are fully protected under CESA, CEQA and ESA. It is illegal to collect, harm, harass, or kill endangered species without the appropriate state Memorandum of Understanding and/or federal 10(A) 1(a) permits.

### **Acknowledgments**

We would like to thank the following persons for reviewing sections of the STE list: Allison Brigham (Lepidoptera), Eric Chapman (Haloplidae), Doug Post (Dytiscidae), John Sandberg (Plecoptera), Joe Slusark (Ephemeroptera). We would also like to thank Teresa Richards for her assistance with the formatting of this document.

### **Literature Cited**

Aquatic Bioassessment Laboratory. 2003. CAMLnet list of Californian macroinvertebrate taxa and standard taxonomic effort. Revision date: 27 January 2003. California Department of Fish and Game.

Rogers, D. C. and A. B. Richards. 2006. Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT) Rules for Developing a Standard Level of Taxonomic Effort Draft Version I, 30 June 2006.

California Department of Fish and Game (DFG). June 2005. Special Animals. 53 pp.

**Phylum: Porifera****Standard Effort Level I:** Phylum**Standard Effort Level II:** Phylum**Standard Taxonomic Reference:** Frost et al. (2001)

The Porifera are generally identified using Frost et al. (2001). Poriferans are not typically enumerated as a quantitative part of benthic samples, as they are colonial and sessile. However, their presence in samples should be noted, as they are indicators of clean, well oxygenated water.

Taxonomic Hierarchy			Habitat			Distribution						Literature Cited			Comments	
Phylum	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja				
Porifera			X	X	X	X	X	X	X	X	X	X	Frost et al. (2001)			

**Literature Cited**

Frost, T. M., H. M. Reiswig, and A. Ricciardi. 2001. Porifera. Ecology and classification of North American freshwater invertebrates, second edition, xvi + 1056 pp. J. H. Thorp and A. P. Covich. San Diego, CA, Academic Press.

**Phylum: Cnidaria**

**Standard Effort Level I:** Genus

**Standard Effort Level II:** Genus

**Standard Taxonomic Reference:** Slobodkin and Bossert (2001)

Cnidarians are generally identified using Slobodkin and Bossert (2001). Fuller et al. (2006) and Mills and Sommer (1995) provide ecological information on *Cordylophora*.

Phylum	Taxonomic Hierarchy				Species	Habitat		Distribution				Literature Cited	Comments			
	Class	Order	Suborder	Family	Genus	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
Cnidaria																
	Hydrozoa														Slobodkin and Bossert (2001)	
		Hydrida													Slobodkin and Bossert (2001)	
			Hydridae												Slobodkin and Bossert (2001)	
				<i>Hydra</i>		X	X	X		X	X	X	X	X	Slobodkin and Bossert (2001)	
		Anthomedusae													Slobodkin and Bossert (2001)	
				Clavidae											Slobodkin and Bossert (2001)	
					<i>Cordylophora</i>		X	X	X	X	X	X	X	X	Fuller et al. (2006); Mills and Sommer (1995); Ruiz et al. (1997)	Non-native invasive species, in brackish and coastal freshwaters, but spreading inland
		Limnomedusae													Slobodkin and Bossert (2001)	
				Olindiadidae											Slobodkin and Bossert (2001)	
					<i>Craspedacusta</i>										Slobodkin and Bossert (2001)	
					<i>Craspedacusta sowerbyi</i> Lankester, 1880	X	X	X		X	X	X	X	X	Slobodkin and Bossert (2001)	

## **Literature Cited**

- Mills, C.E., and F. Sommer. 1995. Invertebrate introductions in marine habitats: two species of hydromedusae (Cnidaria) native to the Black Sea, *Maeotias inexpectata* and *Blackfordia virginica*, invade San Francisco Bay. *Marine Biology* 122:279-288.
- Ruiz, G. M., P. Fofonoff, and A.H. Hines. 1999. Non-indigenous species as stressors in estuarine and marine communities: assessing invasion impacts and interactions. *Journal of Limnology and Oceanography* 44(3, part 2): 950-972.
- Slobodkin, L. B. and P. E. Bossert. 2001. Cnidaria. Ecology and classification of North American freshwater invertebrates, second edition, xvi + 1056 pp. J. H. Thorp and A. P. Covich. San Diego, CA, Academic Press: 135-154.

## **Additional Sources of Information on Cnidaria**

- Fuller, P., E. Maynard, & D. Raikow. 2006. *Cordylophora caspia*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL. Revision Date: 4/3/2006. Accessed 20 September 2006 at URL:  
<http://nas.er.usgs.gov/queries/FactSheet.asp?SpeciesID=1060>

**Phylum: Platyhelminthes****Standard Effort Level I:** Class**Standard Effort Level II:** Class**Standard Taxonomic Reference:** Kolasa (2001)

Platyhelminthes are identified only to class level using Kolasa (2001). Most characters for separating taxa are internal, and there is some confusion regarding the identity of many taxa.

Taxonomic Hierarchy			Habitat					Distribution					Literature Cited		Comments
Phylum	Class	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
Platyhelminthes			X	X	X	X	X	X	X	X	X	X	X	Kolasa (2001)	
	Turbellaria		X	X	X	X	X	X	X	X	X	X	X	Kolasa (2001)	

**Literature Cited**

Kolasa, J. (2001). Flatworms: Turbellaria and Nemertea. Ecology and classification of North American freshwater invertebrates, second edition, xvi + 1056 pp. J. H. Thorp and A. P. Covich. San Diego, CA, Academic Press: 155-180.

**Phylum: Nemertea****Standard Effort Level I:** Genus**Standard Effort Level II:** Genus**Standard Taxonomic Reference:** Kolasa (2001)

Freshwater nemerteans are monogeneric, and are identified using Kolasa (2001).

Taxonomic Hierarchy					Habitat		Distribution						Literature Cited		Comments	
Phylum	Class	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
Nemertea						X	X	X		X	X	X	X	X	X	Kolasa (2001)
	Enopla					X	X	X		X	X	X	X	X	X	Kolasa (2001)
		Hoplonemertea				X	X	X		X	X	X	X	X	X	Kolasa (2001)
			Tetrastemmatidae			X	X	X		X	X	X	X	X	X	Kolasa (2001)
				Prostoma		X	X	X		X	X	X	X	X	X	Kolasa (2001)

**Literature Cited**

Kolasa, J. 2001. Flatworms: Turbellaria and Nemertea. Ecology and classification of North American freshwater invertebrates, second edition, xvi + 1056 pp. J. H. Thorp and A. P. Covich. San Diego, CA, Academic Press: 155-180.

**Phylum: Nematoda****Standard Effort Level I:** excluded from benthic datasets**Standard Effort Level II:** excluded from benthic datasets**Standard Taxonomic Reference:** Poinar (2001)

Nematodes are typically left at phylum. The vast majority of freshwater nematodes are not large enough to be considered “macroinvertebrates”. Typically, the only “macro” nematodes encountered in benthic samples are in the family Mermithidae, which are parasitic on dipterans and ephemeropterans. As they are parasites, they are of little ecological importance. (See STE Rules section 3.4.3)

Taxonomic Hierarchy			Habitat		Estuarine	Distribution					Literature Cited		Comments
Phylum	Genus	Species	Benthic	Lotic		CA	OR	WA	NV	AZ	Baja		
Nematoda			X	X	X	X	X	X	X	X	X	Poinar (2001)	Fresh and brackish; excluded from benthic datasets

**Literature Cited**

Poinar, G. O., Jr. 2001. Nematoda and Nematomorpha. Ecology and classification of North American freshwater invertebrates, second edition, xvi + 1056 pp. J. H. Thorp and A. P. Covich. San Diego, CA, Academic Press: 255-295.

**Phylum: Nematomorpha****Standard Effort Level I:** excluded from benthic datasets**Standard Effort Level II:** excluded from benthic datasets**Standard Taxonomic Reference:** Poinar (2001)

Nematomorphans are typically excluded from CSBP bioassessment datasets. As they are parasites of terrestrial insects, and do not feed as free living adults, they are of little ecological importance (See STE Rules Section 3.4.3).

Taxonomic Hierarchy			Habitat			Distribution					Literature Cited		Comments	
Phylum	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
Nematomorpha			X	X	X		X	X	X	X	X	X	Poinar (2001)	excluded from benthic datasets

**Literature Cited**

Poinar, G. O., Jr. 2001. Nematoda and Nematomorpha. Ecology and classification of North American freshwater invertebrates, second edition, xvi + 1056 pp. J. H. Thorp and A. P. Covich. San Diego, CA, Academic Press: 255-295.

**Phylum: Entoprocta****Standard Effort Level I:** Genus**Standard Effort Level II:** Genus**Standard Taxonomic Reference:** Wood (2001)

Entoprocta are generally identified using Wood (2001). Entoprocts are not typically enumerated as a quantitative part of benthic samples, as they are colonial and sessile. However, their presence in samples should be noted, as they are non-native invasive species in the western US, and are tolerant to a variety of organic pollutants, low oxygen, and high TDS.

Taxonomic Hierarchy					Habitat		Distribution							Literature Cited	Comments		
Phylum	Order	Family	Subfamily	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
Entoprocta																Wood (2001)	Generally excluded from benthic datasets
	Urnatellida															Eng (1977)	
		Urnatellidae														Eng (1977)	
			Urnatella													Eng (1977)	
				<i>Urnatella gracilis</i> Leidy, 1851	X	X	X		X			X				Eng (1977)	

**Literature Cited**

Eng, L.L. 1977. The freshwater entoproct *Urnatella gracilis* Leidy, in the Delta-Mendota Canal, California. Wasmann Journal of Biology 39:56-62

Wood, T. S. 2001. Bryozoans. Ecology and classification of North American freshwater invertebrates, second edition, xvi + 1056 pp. J. H. Thorp and A. P. Covich. San Diego, CA, Academic Press: 505-525.

**Phylum: Ectoprocta****Standard Effort Level I:** Class**Standard Effort Level II:** Class**Standard Taxonomic Reference:** Wood (2001)

Ectoprocta (formerly Bryozoa) are generally identified using Wood (2001). Ectoprocts are not typically enumerated as a quantitative part of benthic samples, as they are colonial and most taxa are sessile. However, their presence in samples should be noted, as they are indicators of clean, well oxygenated water.

Taxonomic Hierarchy				Habitat			Distribution					Literature Cited		Comments		
Phylum	Subphylum	Class	Subclass	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
Ectoprocta																Wood (2001)
		Phylactolaemata			X	X	X	X	X	X	X	X	X	X		Wood (2001)

**Literature Cited**

Wood, T. S. 2001. Bryozoans. Ecology and classification of North American freshwater invertebrates, second edition, xvi + 1056 pp. J. H. Thorp and A. P. Covich. San Diego, CA, Academic Press: 505-525.

**Phylum: Mollusca****Standard Effort Level I:** Genus**Standard Effort Level II:** Genus/ Species**Standard Taxonomic Reference:** Dillon (2006), Burch (1972), Nedeau et al. (2006)

The freshwater mollusks of western North America have a long and convoluted taxonomic history, with much confusion in the literature. Snails should be identified using Dillon (2006). Since the 1980's most workers have followed Burch's (1982, and various iterations thereafter) book on freshwater gastropods, wherein he made many taxonomic changes. However, Burch's work was not peer reviewed, nor published in the peer reviewed literature. For that reason, we follow Hubendick (1951) for the genus *Lymnaea*, Clarke (1981) for *Valvata*, Henderson (1929) for *Juga*, and Baker (1945) for the Planorbidae.

For the bivalves, the Burch (1972) keys remain the best available for the sphaericean clams. Freshwater mussels west of the continental divide are easily separated using Nedeau et al. (2006).

The freshwater snails, clams and mussels are ecologically significant, and their taxonomic relationships are poorly understood. Immature animals are not identifiable due to the tremendous amount of convergence in juvenile forms, and many groups cannot be identified beyond genus level without dissection. Non-native invasive species, particularly the asian clam, *Corbicula*, and the New Zealand Mudsnail, *Potamopyrgus* are ecological threats. Montana State University provides a webpage with useful information on the taxonomy and ecology of *Pomatopyrgus*.

Taxonomic Hierarchy						Habitat		Distribution						Literature Cited		Comments	
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
Mollusca						X	X										
	Bivalvia					X	X										
		Palaeoheterodonta				X	X										
		Unionoida				X	X										
			Unionidae			X	X										
				Anodontida		X	X										
					Anodonta californiensis Lea, 1852	X	X		X	X	X	X	X	X	X	Burch (1975); Nedeau et al. (2006)	
					Anodonta dejuncta Lewis, 1875	X		X		X	X	X				Burch (1975); Nedeau et al.	Nedeau et al. (2006) treat this species

Taxonomic Hierarchy						Habitat		Distribution							Literature Cited		Comments		
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja			
																	(2006)	as a form of <i>A. californiensis</i>	
						<i>Anodonta kennerlyi</i> Lea, 1860	X	X			X	X					Burch (1975); Nedeau et al. (2006)		
						<i>Anodonta nuttaliana</i> Lea, 1838	X	X			X	X	X				Burch (1975); Nedeau et al. (2006)		
						<i>Anodonta oregonense</i> Lea, 1838	X		X		X	X	X	X			Burch (1975); Nedeau et al. (2006)		
						<i>Gonidea</i>	X	X											
						<i>Gonidea angulata</i> (Lea, 1838)	X	X			X	X	X	X			Burch (1975); Nedeau et al. (2006)		
						Margaritiferidae													
						<i>Margaritifera</i>	X	X											
						<i>Margaritifera falcata</i> (Gould, 1850)	X	X			X	X	X	X	X		Burch (1975); Nedeau et al. (2006)		
						Heterodontida	X	X											
						Veneroida	X	X											
						Corbiculidae	X	X											
						<i>Corbicula</i>	X	X			X	X	X	X	X	X	Hanna (1966)	Non-native invasive species	
						Sphaeriidae	X	X	X										
						<i>Musculium</i>	X	X	X										
						<i>Musculium lacustre</i> (Müller, 1774)	X	X	X		X	X	X				Burch (1972)		
						<i>Musculium partumeium</i> (Say, 1822)	X	X	X		X	X	X	X	X		Burch (1972)		
						<i>Musculium secuirs</i> Prime, 1851	X	X	X		X	X	X				Burch (1972)		
						<i>Pisidium</i>	X	X	X										
						<i>Pisidium casertanum</i> (Poli, 1795)	X	X	X		X	X	X	X	X	X	Burch (1972)		
						<i>Pisidium compressum</i> Prime, 1852	X	X	X		X	X	X	X	X	X	Burch (1972)		
						<i>Pisidium conventus</i> Clessin, 1877	X	X	X				X				Burch (1972)		
						<i>Pisidium ferrugineum</i> Prime, 1852	X	X	X				X				Burch (1972)		
						<i>Pisidium idahoense</i> Roper, 1890	X	X	X		X		X				Burch (1972)		
						<i>Pisidium insigne</i> Gabb, 1868	X	X	X				X				Burch (1972)		
						<i>Pisidium lilljeborgi</i> Clessin, 1886	X	X	X		X	X	X				Burch (1972)		
						<i>Pisidium nitidum</i> Jenyns, 1832	X	X	X		X	X	X	X	X		Burch (1972)		
						<i>Pisidium rotundatum</i> Prime, 1851	X	X	X				X				Burch (1972)		
						<i>Pisidium subtruncatum</i> Malam, 1855	X	X	X		X	X	X				Burch (1972)		

Taxonomic Hierarchy					Habitat		Distribution							Literature Cited		Comments		
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
						<i>Pisidium ultramontanum</i> Prime, 1865	X	X	X		X	X					Burch (1972)	
						<i>Pisidium variable</i> Prime, 1852	X	X	X		X	X	X	X	X		Burch (1972)	
						<i>Pisidium ventricosum</i> Prime, 1851	X	X	X				X				Burch (1972)	
						<i>Pisidium walkeri</i> Sterki, 1895	X	X	X						X		Burch (1972)	
					<i>Sphaerium</i>		X	X	X									
						<i>Sphaerium nitidum</i> Clessin, 1876	X	X	X				X				Burch (1972)	
						<i>Sphaerium occidentale</i> (Gould, 1850)	X	X	X			X	X				Burch (1972)	
						<i>Sphaerium patella</i> (Gould, 1850)	X	X	X		X	X	X				Burch (1972)	
						<i>Sphaerium striatum</i> (Lamarck, 1818)	X	X	X		X	X	X	X	X	X	Burch (1972)	
	<i>Gastropoda</i>						X	X	X									
	Prosobranchia						X	X	X									
	Architaenioglossa						X	X	X									
	Viviparidae						X	X	X									
	<i>Bellamya</i>						X	X	X									
	<i>Bellamya chinensis</i> (Gray, 1817)						X	X	X		X	X	X	X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
	<i>Bellamya japonica</i> (von Martens, 1861)						X	X	X		X	X	X	X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
	Ampullariidae						X	X	X									
	<i>Marisa</i>						X	X	X									
	<i>Marisa cornuarietis</i> (Linnaeus, 1758)						X	X	X		X			X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
	Pomacea						X	X	X									
	<i>Pomacea bridgesii</i> (Reeve, 1856)						X	X	X		X			X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
	<i>Pomacea canaliculata</i> (Lamarck, 1828)						X	X	X		X			X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
	<i>Pomacea paludosa</i> (Say, 1829)						X	X	X		X			X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
	Neotaenioglossa						X	X	X									
	Thiaridae						X	X	X									
	<i>Melanoides</i>						X	X	X									
	<i>Melanoides tuberculatus</i> (Müller, 1774)						X	X	X		X			X	X		Perez et al. (2004); Dillon (2006)	Non-native invasive species
	<i>Tarebia</i>						X	X	X									
	<i>Tarebia granifera</i> (Lamarck, 1822)						X	X	X		X			X			Perez et al. (2004)	Non-native invasive species
	Sorbeoconcha						X	X										
	Pleuroceridae						X	X										
	<i>Juga</i>						X	X										
	<i>Juga acutifilosa</i> (Stearns, 1890)						X	X			X	X	X				Perez et al. (2004); Dillon (2006)	

Taxonomic Hierarchy							Habitat		Distribution							Literature Cited		Comments			
Phylum	Class	Subclass	Order	Family	Genus		Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja					
					<i>Juga bulbosa</i> (Gould, 1847)		X	X		X	X						Perez et al. (2004); Dillon (2006)				
					<i>Juga nigrina</i> (Lea, 1856)		X	X		X	X						Perez et al. (2004); Dillon (2006)				
					<i>Juga plicifera</i> (Lea, 1838)		X	X		X	X	X					Perez et al. (2004); Dillon (2006)				
					<i>Juga silicula</i> (Gould, 1847)		X	X		X	X	X					Perez et al. (2004); Dillon (2006)				
				<i>Goniobasis</i>			X	X													
					<i>Goniobasis hemphilli</i> Henderson, 1935		X	X			X	X					Perez et al. (2004); Dillon (2006)				
				<i>Hypsogastropoda</i>			X	X													
				<i>Hydrobiidae</i>			X	X													
				<i>Amnicola</i>			X	X													
					<i>Amnicola limosa</i> (Say, 1817)		X	X		X	X	X	X				Perez et al. (2004)				
				<i>Colligyrus</i>			X	X													
					<i>Colligyrus greggi</i> (Pilsbry, 1935)		X	X			X						Perez et al. (2004); Dillon (2006)				
				<i>Eremopyrgus</i>			X	X													
					<i>Eremopyrgus eganensis</i> Hershler, 1999		X	X					X				Perez et al. (2004)				
				<i>Fluminicola</i>			X	X		X	X	X	X				Perez et al. (2004); Dillon (2006)				
				<i>Ipnobius</i>			X	X													
					<i>Ipnobius robustus</i> (Hershler, 1989)		X	X		X							Perez et al. (2004)				
				<i>Potamopyrgus</i>			X	X													
					<i>Potamopyrgus antipodarum</i> (Gray, 1843)		X	X		X				X		Perez et al. (2004); Dillon (2006)	Non-native invasive species				
				<i>Pristinicola</i>			X	X													
					<i>Pristinicola hemphilli</i> (Pilsbry, 1890)		X	X		X	X	X				Perez et al. (2004); Dillon (2006)					
				<i>Pyrgulopsis</i>			X	X		X	X	X	X	X			Perez et al. (2004); Dillon (2006)				
				<i>Tryonia</i>			X	X	X	X	X			X	X		Perez et al. (2004)				
				<i>Assimineidae</i>			X			X	X										
				<i>Assiminea</i>			X			X	X										
					<i>Assiminea californica</i> (Tryon, 1875)		X			X	X						Perez et al. (2004)				
					<i>Assiminea infima</i> Berry, 1947		X			X	X						Perez et al. (2004)				
				<i>Pomatiopsidae</i>			X			X	X	X	X								
					<i>Pomatiopsis</i>		X			X	X	X	X				Perez et al. (2004)				
				<i>Heterostropha</i>			X	X	X	X	X	X	X								
				<i>Valvatidae</i>																	
					<i>Valvata</i>		X	X	X	X	X	X	X								
					<i>Valvata humeralis</i> Say, 1829		X	X	X	X	X	X	X			Perez et al. (2004); Dillon (2006)					

Taxonomic Hierarchy					Habitat		Distribution							Literature Cited		Comments		
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
						<i>Valvata tricarinata</i> (Say, 1817)	X	X	X	X	X	X				Perez et al. (2004); Dillon (2006)		
						<i>Valvata virens</i> Tryon, 1863	X	X	X	X						Perez et al. (2004); Dillon (2006)		
						Pulmonata												
						Basommatophora												
						<i>Lymnaeidae</i>	X	X	X		X	X	X	X	X			
						<i>Fisherola</i>	X	X	X									
						<i>Fisherola nuttalli</i> (Haldeman, 1841)	X	X	X		X	X				Perez et al. (2004); Dillon (2006)		
						<i>Lanx</i>	X	X	X									
						<i>Lanx patelloides</i> (Lea, 1856)	X	X	X		X	X				Perez et al. (2004); Dillon (2006)		
						<i>Lymnaea</i>	X	X	X		X	X	X	X	X	Perez et al. (2004); Dillon (2006)		
						Physidae	X	X	X		X	X	X	X	X			
						<i>Aplexa</i>	X		X				X					
						<i>Aplexa elongata</i> (Say, 1821)	X		X			X				Wethington (2004); Dillon (2006)		
						<i>Physa</i>	X	X	X		X	X	X	X	X			
						<i>Physa acuta</i> Draparnaud, 1805	X	X	X		X	X	X	X	X	Wethington (2004); Dillon (2006)		
						<i>Physa gyrina</i> Say 1821	X	X	X		X	X	X	X	X	Wethington (2004); Dillon (2006)		
						<i>Physa pomilia</i> (Conrad, 1834)	X	X	X		X	X	X	X	X	Wethington (2004); Dillon (2006)		
						Ellobiidae	X	X	X		X	X						
						<i>Ovatella</i>	X	X	X		X	X						
						<i>Ovatella myosotis</i> (Draparnaud, 1801)	X	X	X		X	X				Hanna (1966)	Non-native invasive species	
						Planorbidae	X	X	X		X	X	X	X	X			
						<i>Biomphalaria</i>	X	X	X					X				
						<i>Biomphalaria havanensis</i> (Pfieffer, 1839)	X	X	X					X		Perez et al. (2004); Dillon (2006)		
						<i>Gyraulus</i>	X	X	X									
						<i>Gyraulus circumstriatus</i> (Tryon, 1866)	X	X	X		X	X	X	X		Perez et al. (2004); Dillon (2006)		
						<i>Gyraulus crista</i> (Linnaeus, 1758)	X	X	X		X	X	X	X		Perez et al. (2004); Dillon (2006)		
						<i>Gyraulus deflectus</i> (Say, 1824)	X	X	X		X	X	X	X	X	Perez et al. (2004); Dillon (2006)		
						<i>Gyraulus parvus</i> (Say, 1817)	X	X	X		X	X	X			Perez et al. (2004); Dillon (2006)		
						<i>Helisoma</i>	X	X	X									
						<i>Helisoma anceps</i> (Menke, 1830)	X	X	X		X	X	X	X	X	Perez et al. (2004); Dillon (2006)		
						<i>Helisoma newberryi</i> (Lea, 1858)	X	X	X		X	X	X			Perez et al. (2004); Dillon (2006)		
						<i>Helisoma subcrenatum</i> (Carpenter, 1857)	X	X	X		X	X				Perez et al. (2004); Dillon (2006)	Non-native invasive species	
						<i>Menetus</i>	X	X	X									

Taxonomic Hierarchy					Habitat		Distribution							Literature Cited	Comments			
Phylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
						<i>Menetus opercularis</i> (Gould, 1847)	X	X	X	X	X	X				Perez et al. (2004); Dillon (2006)		
						<i>Micromenetus</i>	X	X	X									
						<i>Micromenetus dilatatus</i> (Gould, 1841)	X	X	X	X	X	X				Perez et al. (2004); Dillon (2006)		
						<i>Promenetus</i>	X	X	X									
						<i>Promenetus exacuous</i> (Say, 1821)	X	X	X		X	X				Perez et al. (2004); Dillon (2006)		
						<i>Promenetus umbilicatellus</i> (Cockerell, 1887)	X	X	X		X	X				Perez et al. (2004); Dillon (2006)		
						<i>Vorticifex</i>	X	X	X									
						<i>Vorticifex effusa</i> (Lea, 1856)	X	X	X	X	X					Perez et al. (2004); Dillon (2006)		
						<i>Vorticifex solida</i> (Dall 1870)	X	X	X	X		X				Perez et al. (2004); Dillon (2006)	may be a synonym of <i>V. effusa</i> (Lea)	
						<i>Ancylidae</i>												
						<i>Ferrissia</i>	X	X	X	X	X	X	X			Perez et al. (2004); Dillon (2006)		

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## Phylum: Annelida

**Standard Effort Level I:** Class

**Standard Effort Level II:** Oligochaeta and Branchiobdella to class, Hirudinea to genus, Polychaeta to species.

**Standard Taxonomic References:** Kathman and Brinkhurst (1998), Brinkhurst and Gelder (2001), Klemm (1972), Foster (1972)

Annelids are generally identified using Kathman and Brinkhurst (1998) or Brinkhurst and Gelder (2001). Hirudinea can be identified using Davies and Govedich (2001), Klemm (1972) and Klemm (1995). Polychaetes are best identified using Foster (1972). Branchiobdella are typically excluded from CSBP bioassessment samples as they are commensals on crayfish (see STE Rules section 3.4.3).

Taxonomic Hierarchy							Species	Habitat			Distribution						Literature Cited		Comments
Phylum	Subphylum	Class	Subclass	Order	Suborder	Family		Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
Annelida																			
	Hirudinea																		
		Arhynchobdellida																	
			Haemopidae/Hirudinidae				X	X	X		X	X	X	X	X	X	X	Klemm (1972); Klemm (1995)	
			Erpobdellidae				X	X	X		X	X	X	X	X	X	X	Klemm (1972); Klemm (1995)	
				<i>Dina</i>						X	X								
				<i>Erpobdella</i>						X	X	X							
				<i>Mooreobdella</i>						X									
	Rhynchobdelida																		
			Glossiphoniidae				X	X	X		X	X	X	X	X	X	X	Klemm (1972); Klemm (1995)	
				<i>Helobdella</i>															
				<i>Placobdella</i>															
			Piscicolidae				X	X	X		X	X	X	X	X	X	X	Klemm (1972); Klemm (1995)	
	Branchiobdella						X	X	X		X	X	X	X	X	X			
	Polychaeta																		
		Canalipalpata																	
			Serpulidae																
				<i>Ficopomatus</i>															
					<i>Ficopotamus enigmaticus</i> (Fauvel, 1922)		X	X	X	X	X					X	Foster (1972)	Fresh and brackish	
					Sabellidae														

Taxonomic Hierarchy							Habitat							Distribution							Literature Cited			Comments	
Phylum	Subphylum	Class	Subclass	Order	Suborder	Family	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja						
									<i>Manayunkia</i>																
									<i>Manayunkia speciosa</i> Leidy, 1858	X	X	X		X	X	X				Foster (1972)					
									<i>Palpata</i>																
									<i>Aciculata</i>																
									<i>Phylodocida</i>																
									<i>Nereidae</i>																
									<i>Lycastoides</i>																
									<i>Lycastoides alticola</i> Johnston, 1903	X	X			X						Foster (1972)				Only known from a single mountain stream in Sierra Laguna.	
									<i>Neanthes</i>																
									<i>Neanthes limnicola</i> (Johnson, 1901)	X	X	X		X	X	X				Foster (1972)					
									<i>Nereis</i>																
									<i>Nereis succinea</i> Frey & Leuckart, 1847	X	X	X	X	X	X	X	X			Foster (1972)				Fresh and brackish	
									<i>Namanereis</i>																
									<i>Namanereis hawaiiensis</i> (Johnson, 1903)	X	X	X		X						Foster (1972)				Native to Hawai'i, found in a pond in southern CA	
									<i>Scolecida</i>																
									<i>Aeolosomatidae</i>																
									<i>Aeolosoma</i>		X	X	X		X	X	X								
									<i>Clitellata</i>		X	X	X	X	X	X	X	X	X	X					
									<i>Oligochaeta</i>		X	X	X	X	X	X	X	X	X	X	Kathman and Brinkhurst (1998); Brinkhurst and Gelder (2001)				

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## Acari: Mites

**Standard Effort Level I&II:** Genus (where possible)

**Standard Taxonomic Reference:** Smith et al. (2001)

This section remains relatively unchanged since the previous revision of the STE. The standard text is the chapter in Thorp and Covich (Smith et al., 2001), which provides keys to mature and immature specimens. Cook (1974) is an excellent source for detailed illustrations to supplement the newer key. The information in the table below reflects material identified from benthic samples from California streams (primarily by the ABL), and should not be taken as an authoritative list.

Taxonomic Hierarchy		Species	Habitat		Estuarine	Distribution					Literature Cited	Comments
Subphylum	Class		Benthic	Lotic		CA	OR	WA	NV	AZ		
Subclass	Order	Family	Genus									
Chelicerata				X							Smith et al. (2001), Cook (1974)	
Arachnida				X							Smith et al. (2001), Cook (1974)	
	Acari			X							Smith et al. (2001), Cook (1974)	
		Anisitsiellidae		X							Smith et al. (2001), Cook (1974)	
			<i>Utaxatax</i>	X							Smith et al. (2001), Cook (1974)	
		Arrenuridae		X							Smith et al. (2001), Cook (1974)	
			<i>Arrenurus</i>	X							Smith et al. (2001), Cook (1974)	
		Aturidae		X							Smith et al. (2001), Cook (1974)	
			<i>Aturus</i>	X							Smith et al. (2001), Cook (1974)	
			<i>Woolastookia</i>	X							Smith et al. (2001), Cook (1974)	
		Eylaidae		X							Smith et al. (2001), Cook (1974)	
			<i>Eylais</i>	X							Smith et al. (2001), Cook (1974)	
		Frontipodopsidae		X							Smith et al. (2001), Cook (1974)	
			<i>Frontipodopsis</i>	X							Smith et al. (2001), Cook (1974)	
		Hydrodromidae		X							Smith et al. (2001), Cook (1974)	
			<i>Hydrodroma</i>	X							Smith et al. (2001), Cook (1974)	
		Hydryphantidae		X							Smith et al. (2001), Cook (1974)	
			<i>Partunia</i>	X							Smith et al. (2001), Cook (1974)	
			<i>Protzia</i>	X							Smith et al. (2001), Cook (1974)	
			<i>Thyopsooides</i>	X							Smith et al. (2001), Cook (1974)	
			<i>Wandesia</i>	X							Smith et al. (2001), Cook (1974)	

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited		Comments	
Subphylum	Class	Subclass	Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja				
				Hygrobatiidae		X												Smith et al. (2001), Cook (1974)		
					<i>Atractides</i>	X												Smith et al. (2001), Cook (1974)		
					<i>Corticacarus</i>	X												Smith et al. (2001), Cook (1974)		
					<i>Hygrobates</i>	X												Smith et al. (2001), Cook (1974)		
				Lebertiidae		X												Smith et al. (2001), Cook (1974)		
					<i>Estelloxus</i>	X												Smith et al. (2001), Cook (1974)		
					<i>Lebertia</i>	X												Smith et al. (2001), Cook (1974)		
					<i>Scutolebertia</i>	X												Smith et al. (2001), Cook (1974)		
				Limnesiidae		X												Smith et al. (2001), Cook (1974)		
					<i>Limnesia</i>	X												Smith et al. (2001), Cook (1974)		
					<i>Neotyrellia</i>	X												Smith et al. (2001), Cook (1974)		
					<i>Tyrellia</i>	X												Smith et al. (2001), Cook (1974)		
				Limnocharididae		X												Smith et al. (2001), Cook (1974)		
					<i>Limnochares</i>	X												Smith et al. (2001), Cook (1974)		
					<i>Neolimnochares</i>	X												Smith et al. (2001), Cook (1974)		
				Mideopsidae		X												Smith et al. (2001), Cook (1974)		
					<i>Mideopsis</i>	X												Smith et al. (2001), Cook (1974)		
				Momoniidae		X												Smith et al. (2001), Cook (1974)		
					<i>Momonia</i>	X												Smith et al. (2001), Cook (1974)		
				Sperchontidae		X												Smith et al. (2001), Cook (1974)		
					<i>Sperchon</i>	X												Smith et al. (2001), Cook (1974)		
					<i>Sperchonopsis</i>	X												Smith et al. (2001), Cook (1974)		
				Torrenticolidae		X												Smith et al. (2001), Cook (1974)		
					<i>Pseudotorrenticola</i>	X												Smith et al. (2001), Cook (1974)		
					<i>Testudacarus</i>	X												Smith et al. (2001), Cook (1974)		
					<i>Torrenticola</i>	X												Smith et al. (2001), Cook (1974)		
				Unionicolidae		X												Smith et al. (2001), Cook (1974)		
					<i>Neumania</i>	X												Smith et al. (2001), Cook (1974)		
					<i>Unionicola</i>	X												Smith et al. (2001), Cook (1974)		

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## **Subphylum: Crustacea**

**Standard Effort Level I:** Genus

**Standard Effort Level II:** Genus/Species

**Standard Taxonomic Reference:** Rogers (2005)

The Crustacea are best separated using the keys in Rogers (2005) and literature cited therein. Crustaceans are important in bioassessment: mysids, amphipods and isopods are sensitive to many pollutants and heavy metals, most crayfish and freshwater crabs are invasive species, and there are several state and federally protected species.

In Napa, Sonoma and Marin counties in California, many streams and rivers are occupied by the California Freshwater Shrimp (*Syncaris pacifica*), which is both a state and federally protected species. In temporary pools and streams in the Agate Desert area in southern Oregon, and California's Great Central Valley and the southern California coastal counties are five federally protected fairy shrimp and one federally protected tadpole shrimp. These animals are protected under the state and federal Endangered Species Acts and the California Environmental Quality Act. Any individual, private company or agency that violates these laws may be subject to substantial fines, imprisonment, or both.

Taxonomic Hierarchy							Species	Habitat		Estuarine	Distribution					Literature Cited	Comments	
Subphylum	Class	Subclass	Superorder	Order	Suborder	Family		Benthic	Lotic		CA	OR	WA	NV	AZ	Baja		
Crustacea																		
	Branchiopoda								X									
		Sarrostraca							X							Eriksen and Belk (1999); Rogers (2002)		
			Anostraca															
				Artemina					X									
					Artemiidae				X									
						Artemia			X									
							<i>Artemia franciscana</i> Kellogg, 1906		X	X	X	X	X	X	X	Eriksen and Belk (1999)	Salt lakes	
								<i>Artemia monica</i> Verrill, 1869		X	X					Eriksen and Belk (1999)	Reported only from Mono Lake	
								Branchinecta		X	X	X	X	X	X	Eriksen and Belk (1999)		
									<i>Branchinecta campestris</i> Lynch, 1960		X	X	X			Rogers (2006)	Freshwater layers on salt lakes	
										<i>Branchinecta coloradensis</i> Packard, 1874		X	X	X	X	X	Belk and Rogers (2002)	Temporary wetlands

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited		Comments			
Subphylum	Class	Subclass	Superorder	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja					
								<i>Branchinecta conservatio</i> Eng et al., 1990			X		X						Eriksen and Belk (1999)	Listed under the Federal Endangered Species Act; Temporary wetlands			
								<i>Branchinecta cornigera</i> Lynch, 1958			X			X	X						Temporary wetlands		
								<i>Branchinecta dissimilis</i> Lynch, 1972			X		X	X					Erikson and Belk (1999)	Temporary wetlands			
								<i>Branchinecta gigas</i> Lynch, 1937			X		X	X	X	X			Erikson and Belk (1999)	Temporary wetlands			
								<i>Branchinecta hiberna</i> Rogers and Fugate, 2001			X		X	X				Rogers and Fugate (2001)	Temporary wetlands				
								<i>Branchinecta lindahli</i> Packard, 1883			X		X	X	X	X	X	Eriksen and Belk (1999)	Temporary wetlands				
								<i>Branchinecta longiantenna</i> Eng et al., 1990			X		X					Eriksen and Belk (1999)	Listed under the Federal Endangered Species Act; Temporary wetlands				
								<i>Branchinecta lynchi</i> Eng et al., 1990			X		X	X				Eriksen and Belk (1999)	Listed under the Federal Endangered Species Act; Temporary wetlands				
								<i>Branchinecta mackini</i> Dexter, 1956			X		X	X	X	X	X	Eriksen and Belk (1999)	Temporary wetlands				
								<i>Branchinecta mesovallensis</i> Belk and Fugate, 2000										Eriksen and Belk (1999)	Temporary wetlands				
								<i>Branchinecta oriana</i> Belk and Rogers, 2002			X		X			X		Belk and Rogers (2002)	Temporary wetlands				
								<i>Branchinecta oterosanvinceti</i> Obregon-Barboza et al, 2002			X									Temporary wetlands			
								<i>Branchinecta packardi</i> Pearse, 1912			X						X	X			Temporary wetlands		
								<i>Branchinecta sandiegonensis</i> Fugate, 1993			X		X				X	Eriksen and Belk (1999)	Listed under the Federal Endangered Species Act; Temporary wetlands				
								Chirocephalidae			X		X	X	X	X	X				Temporary wetlands		
								<i>Eubranchipus</i>			X		X	X	X		X				Temporary wetlands		
								<i>Eubranchipus bundyi</i> Forbes, 1876			X		X	X	X		X	Eriksen and Belk (1999); Hill et al. (1997)	Temporary wetlands				
								<i>Eubranchipus oregonus</i> Creaser, 1930			X		X	X				Eriksen and Belk (1999); Hill et al. (1997)	Temporary wetlands				
								<i>Eubranchipus serratus</i> Forbes, 1976			X		X	X	X	X		Eriksen and Belk (1999); Hill et al. (1997)	Temporary wetlands				
								<i>Linderiella</i>			X		X					Eriksen and Belk (1999)	Temporary wetlands				
								<i>Linderiella occidentalis</i> (Dodds, 1923)			X		X					Eriksen and Belk (1999)	Temporary wetlands				
								<i>Linderiella santarosae</i> Thiery and Fugate, 1994			X		X					Eriksen and Belk (1999)	Temporary wetlands				
								Streptocephalidae			X		X	X	X	X	X	Eriksen and Belk (1999)	Temporary wetlands				
								<i>Streptocephalus</i>			X		X	X	X	X	X	Eriksen and Belk (1999)	Temporary wetlands				

Taxonomic Hierarchy							Habitat				Distribution						Literature Cited		Comments			
Subphylum	Class	Subclass	Superorder	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja				
								<i>Streptocephalus dorothae</i> Mackin, 1942		X		X					X	X	Eriksen and Belk (1999)	Temporary wetlands		
								<i>Streptocephalus mackini</i> Moore, 1966		X							X	X	Eriksen and Belk (1999)	Temporary wetlands		
								<i>Streptocephalus sealii</i> Ryder, 1879		X		X	X	X		X			Eriksen and Belk (1999)	Temporary wetlands		
								<i>Streptocephalus texanus</i> Packard, 1871		X		X				X	X		Eriksen and Belk (1999)	Temporary wetlands		
								<i>Streptocephalus wootomi</i> Eng et al., 1990			X								Eriksen and Belk (1999)	Listed under the Federal Endangered Species Act; Temporary wetlands		
								Thamnocephalidae		X		X				X	X	X		Temporary wetlands		
								<i>Thamnocephalus</i>			X		X			X	X	X		Temporary wetlands		
								<i>Thamnocephalus mexicanus</i> Linder, 1941		X						X	X		Eriksen and Belk (1999)	Temporary wetlands		
								<i>Thamnocephalus platyurus</i> Packard, 1877		X		X			X	X	X		Eriksen and Belk (1999)	Temporary wetlands		
	Phylopoda									X		X	X	X	X	X	X	Rogers (2005)		Temporary wetlands		
								Notostraca		X		X	X	X	X	X	X		Rogers (2001)		Temporary wetlands and temporary streams	
								Triopsidae		X		X			X	X			Rogers (2001)		Temporary wetlands and temporary streams	
								<i>Lepidurus</i>			X		X	X	X	X	X		Rogers (2001)		Temporary wetlands and temporary streams	
								<i>Lepidurus bilobatus</i> Packard, 1883		X		X			X				Rogers (2001)		Temporary wetlands and temporary streams	
								<i>Lepidurus couesei</i> Packard, 1875		X			X	X					Rogers (2001)		Temporary wetlands and temporary streams	
								<i>Lepidurus cryptus</i> Rogers, 2001		X		X	X			X			Rogers (2001)		Temporary wetlands and temporary streams	
								<i>Lepidurus lemmoni</i> Holmes, 1894		X		X	X	X	X	X	X		Rogers (2001)		Temporary wetlands and temporary streams	
								<i>Lepidurus packardi</i> Simon, 1886			X		X							Rogers (2001)		Listed under the Federal Endangered Species Act; temporary wetlands and temporary streams
								Triops			X		X	X	X	X	X	X	Rogers (2005)		Temporary wetlands	
								<i>Triops longicaudatus</i> (LeConte, 1846)		X		X	X	X	X	X	X		Rogers (2005)		Temporary wetlands	
	Diplostraca									X		X	X	X	X	X	X	X	Rogers (2005)		Temporary wetlands	
								Laevicaudata			X		X	X	X	X	X	X	Martin and Belk (1988)		Temporary wetlands	
								Lynceidae			X		X	X	X	X	X	X	Martin and Belk (1988)		Temporary wetlands	
								<i>Lynceus</i>			X		X	X	X	X	X	X	Martin and Belk (1988)		Temporary wetlands	
								<i>Lynceus brachyurus</i> Muller, 1776		X		X	X	X	X	X	X		Martin and Belk (1988)		Temporary wetlands	
								<i>Lynceus brevifrons</i> (Packard, 1877)		X							X	X	Martin and Belk (1988)		Temporary wetlands	
								<i>Lynceus mucronatus</i> (Packard, 1875)			X				X				Martin and Belk (1988)		Temporary wetlands	
								Spinicaudata			X		X	X	X	X	X	X	Wootton and Mattox (1958)		Temporary wetlands	
								Cyzicidae			X		X	X	X	X	X	X	Wootton and Mattox (1958)		Temporary wetlands	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited		Comments	
Subphylum	Class	Subclass	Superorder	Order	Suborder	Family	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja				
							<i>Cyzicus</i>			X		X	X	X	X	X	X	Wootton and Mattox (1958)		Temporary wetlands	
							<i>Eocyzicus</i>			X		X			X	X	X	Wootton and Mattox (1958)		Temporary wetlands	
							<i>Eocyzicus digueti</i> (Richard, 1895)			X		X			X	X	X	Wootton and Mattox (1958)		Temporary wetlands	
							<i>Leptestheriidae</i>			X		X			X	X	X	Martin and Cash-Clark (1993)		Temporary wetlands	
							<i>Leptestheria</i>			X		X			X	X	X	Martin and Cash-Clark (1993)		Temporary wetlands	
							<i>Leptestheria compleximanus</i> (Packard, 1877)			X		X			X	X	X	Martin and Cash-Clark (1993)		Temporary wetlands	
							<i>Cladocera</i>	X	X	X		X	X	X	X	X	X				
	<i>Maxillopoda</i>							X	X	X	X	X	X	X	X	X	X				
	<i>Branchiura</i>							X	X	X	X	X	X	X	X	X	X	Cressey (1972)		Parasites	
	<i>Arguloida</i>							X	X	X	X	X	X	X	X	X	X	Cressey (1972)		Parasites	
	<i>Argulidae</i>							X	X	X	X	X	X	X	X	X	X	Cressey (1972)		Parasites	
	<i>Argulus</i>							X	X	X	X	X	X	X	X	X	X	Cressey (1972)		Parasites	
	<i>Copepoda</i>							X	X	X	X	X	X	X	X	X	X				
	<i>Ostracoda</i>							X	X	X	X	X	X	X	X	X	X				
	<i>Malacostraca</i>							X	X	X	X	X	X	X	X	X	X	Rogers (2005)			
	<i>Eumalacostraca</i>							X	X	X	X	X	X	X	X	X	X	Rogers (2005)			
	<i>Peracarida</i>							X	X	X	X	X	X	X	X	X	X	Rogers (2005)			
	<i>Mysida</i>							X	X	X	X	X	X	X	X	X	X	Rogers (2005)			
	<i>Mysidae</i>							X	X	X	X	X	X	X	X	X	X	Rogers (2005)			
	<i>Acanthomysis</i>							X	X	X	X	X	X	X				Rogers (2005)			
	<i>Acanthomysis aspera</i> li, 1964							X	X	X	X	X	X	X				Rogers (2005)		Fresh and brackish water	
	<i>Acanthomysis hwanhaiensis</i> li, 1964							X	X	X	X	X						Rogers (2005)		Fresh and brackish water	
	<i>Hyperacanthomysis</i>							X	X	X	X	X						Fukoka and Murano (2000)		Fresh and brackish water	
	<i>Hyperacanthomysis longirostris</i> (li, 1964)							X	X	X	X	X						Fukoka and Murano (2000)		Fresh and brackish water	
	<i>Alienacanthomysis</i>							X	X	X	X	X	X	X				Rogers (2005)		Fresh and brackish water	
	<i>Alienacanthomysis macropsis</i> (Tattersall, 1932)							X	X	X	X	X	X	X				Rogers (2005)		Fresh and brackish water	

Taxonomic Hierarchy							Habitat							Distribution							Literature Cited			Comments		
Subphylum	Class	Subclass	Superorder	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja								
								<i>Deltamysis</i>	X	X	X	X	X								Bowman and Orsi (1992)					
								<i>Deltamysis homquistae</i> Bowman and Orsi, 1992	X	X	X	X	X								Bowman and Orsi (1992)			Fresh and brackish water		
								<i>Mysis</i>	X	X	X		X	X	X	X					Rogers (2005)					
								<i>Neomysis</i>	X	X	X		X	X	X						Rogers (2005)					
								<i>Neomysis kadiakensis</i> Ortmann, 1908	X	X	X		X	X	X						Rogers (2005)					
								<i>Neomysis mercedis</i> Homes, 1896	X	X	X		X	X	X						Rogers (2005)					
								<i>Amphipoda</i>	X	X	X	X	X	X	X	X	X	X			Rogers (2005)					
								<i>Talitridae</i>		X	X		X	X	X	X	X	X			Rogers (2005)			Terrestrial to amphibious		
								<i>Arctitalitus</i>		X	X		X	X	X	X	X	X			Rogers (2005)			Terrestrial to amphibious		
								<i>Arctitalitus sylvaticus</i> (Haswell, 1879)		X	X		X	X	X	X	X	X			Rogers (2005)			Terrestrial to amphibious		
								<i>Talitroides</i>		X	X		X	X	X	X	X	X			Rogers (2005)			Terrestrial to amphibious		
								<i>Talitroides alluaudi</i> Chevreux, 1898		X	X		X	X	X	X	X	X			Morino and Ortal (1993)			Terrestrial to amphibious		
								<i>Talitroides topitotum</i> Burt, 1934		X	X		X	X	X	X	X	X			Rogers (2005)			Terrestrial to amphibious		
								<i>Hyalellidae</i>	X	X	X		X	X	X	X	X	X			Gonzales and Watling (2002)					
								<i>Hyalella</i>	X	X	X		X	X	X	X	X	X			Gonzales and Watling (2002)					
								<i>Haustoridae</i>			X				X							Bousfield (1958)				
								<i>Diporeia</i>			X				X							Bousfield (1958)				
								<i>Diporeia erythrophthalma</i> (Waldron, 1953)			X				X							Bousfield (1958)				
								<i>Crangonyctidae</i>	X	X			X	X	X	X	X	X				Rogers (2005)				
								<i>Crangonyx</i>	X	X			X	X	X	X	X	X				Rogers (2005)				
								<i>Stygobromus</i>	X	X			X	X	X	X	X	X				Rogers (2005)				
								<i>Stygonyx</i>	X	X					X							Bousfield and Holsinger (1989)				
								<i>Stygonyx courtneyi</i> Bousfield and Holsinger, 1989	X	X				X							Bousfield and Holsinger (1989)					
								<i>Gammaridae</i>	X	X	X		X	X	X	X	X	X				Rogers (2005)				
								<i>Gammarus</i>	X	X	X		X	X	X	X	X	X				Rogers (2005)				
								<i>Anisogammaridae</i>	X	X	X		X	X	X							Bousfield & Morino (1992)				
								<i>Ramellogammarus</i>	X	X	X		X	X	X							Bousfield & Morino				

Taxonomic Hierarchy							Habitat		Distribution							Literature Cited	Comments		
Subphylum	Class	Subclass	Superorder	Order	Suborder	Family	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
							<i>Ramellogammarus californicus</i> Bousfield and Morino, 1992	X	X	X		X						(1992)	
							<i>Ramellogammarus campestris</i> Bousfield and Morino, 1992	X	X	X	X		X					Bousfield & Morino (1992)	Fresh and brackish water
							<i>Ramellogammarus columbianus</i> Bousfield and Morino, 1992	X	X	X	X	X	X	X				Bousfield & Morino (1992)	Fresh and brackish water
							<i>Ramellogammarus littoralis</i> Bousfield and Morino, 1992	X	X	X	X		X					Bousfield & Morino (1992)	Fresh and brackish water
							<i>Ramellogammarus oregonensis</i> (Shoemaker, 1944)	X	X	X	X	X	X	X				Bousfield & Morino (1992)	Fresh and brackish water
							<i>Ramellogammarus ramellus</i> (Weckel, 1907)	X	X	X	X	X	X					Bousfield & Morino (1992)	Fresh and brackish water
							<i>Ramellogammarus setosus</i> Bousfield and Morino, 1992	X	X	X				X				Bousfield & Morino (1992)	
							<i>Ramellogammarus similimanus</i> (Bousfield, 1961)	X	X	X			X					Bousfield & Morino (1992)	
							<i>Ramellogammarus vancouverensis</i> Bousfield, 1979	X	X	X	X			X				Bousfield & Morino (1992)	Fresh and brackish water
							Corophiidae		X	X	X	X	X	X	X			Bousfield & Hoover (1997)	Fresh and brackish water
							<i>Americorophium</i>		X	X	X	X	X	X	X			Bousfield & Hoover (1997)	Fresh and brackish water
							<i>Americorophium spinicorne</i> (Stimpson, 1857)		X	X	X	X	X	X	X			Bousfield & Hoover (1997)	Fresh and brackish water
							<i>Americorophium salmonis</i> (Stimpson, 1857)		X	X	X	X		X	X			Bousfield & Hoover (1997)	Fresh and brackish water
							<i>Americorophium stimpsoni</i> (Shoemaker, 1941)		X	X	X	X	X	X				Bousfield & Hoover (1997)	Fresh and brackish water
							Isopoda		X	X	X	X	X	X	X	X	X	Rogers (2005)	Fresh and brackish water
							Flabellifera		X	X	X	X	X	X				Rogers (2005)	Fresh and brackish water
							Sphaeromatidae		X	X	X	X	X	X				Rogers (2005)	Fresh and brackish water
							<i>Gnorimosphaeroma</i>		X	X	X	X	X	X				Rogers (2005)	Fresh and brackish water
							Asellota		X	X	X		X	X	X	X		Williams (1970, 1976)	
							Asellidae		X	X	X		X	X	X	X		Williams (1970, 1976); Toft et al. (2002)	

Taxonomic Hierarchy							Habitat		Distribution							Literature Cited	Comments		
Subphylum	Class	Subclass	Superorder	Order	Suborder	Family	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
						Asellus		X	X	X		X	X	X				Toft et al. (2002)	
						<i>Asellus hilgendorfi</i> Bouvallius, 1886		X	X	X		X	X	X				Magniez and Toft (2000); Toft et al. (2002)	Non-native invasive species
						Caecidotea		X	X	X		X	X	X	X			Williams (1970, 1976)	
						<i>Caecidotea communis</i> (Say, 1818)		X	X	X				X				Williams (1970, 1972)	
						<i>Caecidotea occidentalis</i> (Williams, 1970)		X	X	X		X	X	X				Williams (1970, 1976); Bowman (1974)	
						<i>Caecidotea racovitzai</i> (Williams)		X	X	X		X		X				Williams (1970, 1976)	Introduced in CA
						<i>Caecidotea sequoiae</i> Bowman, 1975		X	X	X		X						Bowman (1975)	
						<i>Caecidotea tomalensis</i> (Harford, 1877)		X	X	X		X						Bowman (1974)	
						<i>Columbasellus</i>		X	X	X				X				Lewis et al. (2003)	
						<i>Columbasellus acheron</i> Lewis, Martin and Wetzer, 2003		X	X	X				X				Lewis et al. (2003)	
						<i>Calasellus</i>		X	X	X		X						Bowman (1981)	
						<i>Calasellus californicus</i> (Miller, 1933)		X	X	X		X						Miller (1933); Bowman (1981)	
						<i>Calasellus longus</i> (Bowman, 1981)		X	X	X		X						Bowman (1981)	
						<i>Salmasellus</i>		X	X	X			X	X				Lewis (2001)	
						<i>Salmasellus howarthi</i> Lewis, 2001		X	X	X			X	X				Lewis (2001)	
						Munnidae		X	X	X		X						Rogers (2005)	
						Oniscidea		X	X	X		X	X	X	X	X	X	Rogers (2005)	
						Ligiidae		X	X	X		X	X	X				Rogers (2005)	
						<i>Ligium</i>		X	X	X								Rogers (2005)	
						Tanaidacea		X	X	X	X	X	X	X				Rogers (2005)	Fresh and brackish water
						Tanaidae		X	X	X	X	X	X	X				Rogers (2005)	Fresh and brackish water
						<i>Sinelobus</i>		X	X	X	X	X	X	X				Rogers (2005)	Fresh and brackish water
						<i>Sinelobus stanfordi</i> (Richards, 1901)		X	X	X	X	X	X	X				Rogers (2005)	Fresh and brackish water
						Leptocheilidae		X	X	X	X	X	X	X				Rogers (2005)	Fresh and brackish water
						<i>Leptocheilia</i>		X	X	X	X	X	X	X				Rogers (2005)	Fresh and brackish water
						<i>Leptocheilia dubia</i> (Kroyer, 1842)		X	X	X	X	X	X	X				Rogers (2005)	Fresh and brackish water
						Decapoda		X	X	X	X	X	X	X	X	X	X	Rogers (2005)	Fresh and brackish water
						Atyidae		X	X	X		X						Rogers (2005)	
						<i>Syncaris</i>		X	X	X		X						Martin and Wicksten (2004); Rogers (2005)	

Taxonomic Hierarchy							Habitat		Distribution					Literature Cited		Comments			
Subphylum	Class	Subclass	Superorder	Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
								<i>Syncaris pacifica</i> (Holmes, 1895)	X	X	X		X					Martin and Wicksten (2004); Rogers (2005)	Listed under the Federal and California State Endangered Species Acts
								<i>Syncaris pasadenae</i> (Kingsley, 1897)	X	X	X		X					Martin and Wicksten (2004); Rogers (2005)	Possibly extinct
								Palaemonidae	X	X	X	X	X	X	X	X	X	Holthuis (1952); Jayachandran (2001); Rogers (2005)	
								<i>Palaemonetes</i>	X	X	X		X	X	X	X	X	Holthuis (1952)	
								<i>Palaemonetes kadiakensis</i> Rathbun, 1902	X	X	X		X					Holthuis (1952); Rogers (2005)	
								<i>Palaemonetes paludosus</i> Gibbes, 1850	X	X	X		X	X	X	X	X	Holthuis (1952)	
								<i>Palaemon</i>	X	X	X		X	X				Holthuis (1952)	
								<i>Palaemon macrodactylus</i> Rathbun, 1902	X	X	X		X	X				Jayachandran (2001)	
								<i>Exopalaemon</i>	X	X	X	X	X	X				Jayachandran (2001); Rogers (2005)	Fresh and brackish water
								<i>Exopalaemon carinicauda</i> (Holthuis, 1950)	X			X	X					Jayachandran (2001)	Fresh and brackish water
								<i>Exopalaemon modestus</i> (Heller, 1862)	X	X	X		X	X	X			Jayachandran (2001)	
								Astacidae	X	X	X		X	X	X	X	X	Rigel (1959); Rogers (2005)	
								<i>Pacifasticus</i>	X	X	X		X	X	X	X	X	Rigel (1959); Rogers (2005)	
								<i>Pacifasticus connectens</i> (Faxon, 1914)	X	X	X			X				Rigel (1959); Rogers (2005)	
								<i>Pacifasticus fortis</i> (Faxon, 1914)	X	X	X		X					Rigel (1959); Rogers (2005)	
								<i>Pacifasticus gambelii</i> (Girard, 1852)	X	X	X		?	X	X	X		Rigel (1959); Rogers (2005)	
								<i>Pacifasticus lenisculus klamathensis</i> (Stimpson, 1859)	X	X	X		X	X	X			Rigel (1959); Rogers (2005)	
								<i>Pacifasticus lenisculus lenisculus</i> (Dana, 1852)	X	X	X		X	X	X	X	X	Rigel (1959); Rogers (2005)	
								<i>Pacifasticus lenisculus trowbridgii</i> (Stimpson, 1857)	X	X	X			X	X			Rigel (1959); Rogers (2005)	
								<i>Pacifasticus nigrescens</i> (Stimpson, 1857)	X	X	X		X					Rigel (1959); Rogers (2005)	May be extinct
								Cambaridae	X	X	X		X	X	X	X	X	Rigel (1959); Rogers (2005)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited		Comments		
Subphylum	Class	Subclass	Superorder	Order	Suborder	Family	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja					
							<i>Orconectes</i>	X	X	X		X	X	X	X	X	X	Rigel (1959); Rogers (2005)				
							<i>Orconectes neglectus neglectus</i> (Faxon, 1885)	X	X	X			X					Rigel (1959); Rogers (2005)				
							<i>Orconectes virilis</i> (Hagen, 1870)	X	X	X		X					X	Rigel (1959); Rogers (2005)				
							<i>Procambarus</i>	X	X	X		X	X			X	X	X	Rigel (1959); Rogers (2005)			
							<i>Procambarus clarkii</i> (Girard, 1852)	X	X	X		X	X			X	X	X	Rigel (1959); Rogers (2005)			
							<i>Grapsidae</i>	X	X	X	X	X						Rogers (2005)	Fresh and brackish water			
							<i>Eriocheir</i>	X	X	X	X	X						Rogers (2005)	Fresh and brackish water			
							<i>Eriocheir sinensis</i> Milne-Edwards, 1854	X	X	X	X	X						Rogers (2005)	Fresh and brackish water			
							<i>Panopeidae</i>	X			X	X	X					Rogers (2005)				
							<i>Rhithropanopeus</i>	X			X	X	X					Rogers (2005)				
							<i>Rhithropanopeus harrisii</i> (Gould, 1841)	X			X	X	X					Rogers (2005)				
							<i>Geothelphusidae</i>	X	X	X						X		Rogers (2005)				
							<i>Geothelphusa</i>	X	X	X						X		Rogers (2005)				
							<i>Geothelphusa dehaani</i> (White, 1874)	X	X	X						X		Rogers (2005)				
							<i>Ocypodidae</i>	X			X	X						Rogers (2005)				
							<i>Uca</i>	X			X	X						Rogers (2005)				
							<i>Uca crenulata</i> (Lockington, 1877)	X			X	X						Rogers (2005)				

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#### **Additional Sources of Information on Crustacea**

Large Branchiopod Bibliography, updated 6 March 2006. Accessed 27 September 2006 at URL:  
<http://www3.uakron.edu/biology/bibintro.html>

## Collembola: Springtails

**Standard Effort Level I:** Rejected from benthic datasets

**Standard Effort Level II:** Rejected from benthic datasets

**Standard Taxonomic Reference:** Christiansen and Snider (1996)

Collembolans can be identified to genus using the key in Merritt and Cummins (Christiansen and Snider, 1996) or Hilsenhoff (2001). Collembola live neustonically or near any aquatic or moist habitat including stream and pond margins, intertidal pools, watersoaked wood and carpet and even in human skin (Altschuler et al., 2004). Collembola are generally rejected from benthic datasets.

Taxonomic Hierarchy				Habitat		Distribution						Literature Cited			Comments	
Class	Subclass	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja			
Collembola				X	X	X	X	X	X	X	X	X	X	Christiansen and Snider (1996); Hilsenhoff (2001)	rejected from benthic datasets	

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## Ephemeroptera: Mayflies

**Standard Effort Level I:** Genus

**Standard Effort Level II:** Species (where possible)

**Standard Taxonomic Reference:** Edmunds and Waltz (1996)

Nymphs can be identified to genus using the key in Merritt and Cummins (Edmunds and Waltz, 1996). Considerable reorganization of the baetid genera has taken place since the key was published (Lugo-Ortiz and McCafferty, 1998). A mayfly workshop was given by the Northwest Biological Assessment Workgroup in 2005. The manual created by Jacobus and Randolph (2005) serves as a very useful supplementary text with numerous provisional keys and unpublished distributional and habitat information for western mayflies. There are two useful websites on Ephemeroptera: Mayfly Central, hosted by Purdue University, maintains the Mayflies of North America checklist and has distributional information, and; Ephemeroptera Galactica, hosted by the Museum Collections of Aquatic Entomology at Florida A&M University, has a bibliography that offers many mayfly paper PDFs.

Taxonomic Hierarchy			Habitat		Distribution							Literature Cited	Comments		
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
Ephemeroptera			X X X	X X X X X X										Edmunds and Waltz (1996)	for keys to families and genera
	Ameletidae		X X		X X X ?	X									
		<i>Ameletus</i>	X X		X									Zloty (1996)	Not all species described as nymphs -- best to leave identifications at <i>Ameletus</i> sp.
	Ametropodidae		X X		X X X										
		<i>Ametropus</i>	X X		X X X									Allen and Edmunds (1976); McCafferty (2001)	nymphs for both North American species are known and keyed in Allen and Edmunds (1976)
		<i>Ametropus ammophilus</i> Allen and Edmunds, 1976	X X		X X X										
	Baetidae		X		X									Edmunds and Waltz (1996); Lugo-Ortiz and McCafferty (1998); Morihara and McCafferty (1979)	The key in Merritt and Cummins will work for most of the baetid genera, except for the Baetis complex. Lugo-Ortiz and McCafferty (1998) will separate these genera. Morihara and McCafferty (1979) is still useful since it contains good descriptions.
		<i>Acentrella</i>	X		X									Jacobus and McCafferty (2006)	
		<i>Acentrella insignificans</i> (McDunnough, 1926)	X X		X X			X X						Jacobus and McCafferty (2006)	
		<i>Acentrella turbida</i> (McDunnough, 1924)	X X		? X				X					Jacobus and McCafferty (2006)	

Taxonomic Hierarchy			Habitat		Distribution				Literature Cited		Comments		
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NVAZ	Baja	
		<i>Acerpenna</i>		X	X		X						
		<i>Apobaetis</i>		X	X			X				Meyer and McCafferty (2004)	Occurs in warm water streams; Tuolumne River in CA Central Valley
		<i>Apobaetis etowah</i> (Traver, 1935)		X	X			X				Meyer and McCafferty (2004)	Occurs in warm water streams; Tuolumne River in CA Central Valley
		<i>Baetis</i>		X	X			X	X	X	X	Wiersema et al. (2004); Moribara and McCafferty (1979)	The nymphs for several species remain undescribed
		<i>Baetis adonis</i> Traver, 1935		X	X		?						
		<i>Baetis alias</i> Day, 1954		X	X		X			X			
		<i>Baetis bicaudatus</i> Dodds, 1923		X	X			X	X	X			
		<i>Baetis caurinus</i> Edmunds and Allen, 1957		X	X					X			nymph stage unknown
		<i>Baetis diabolus</i> Day, 1954		X	X				X				nymph stage unknown
		<i>Baetis flavistriga</i> McDunnough, 1921		X	X		?						
		<i>Baetis magnus</i> McCafferty and Waltz, 1986		X	X		?			X			
		<i>Baetis notos</i> Allen and Murvosh, 1987		X	X					X			
		<i>Baetis palisadi</i> Mayo, 1952		X	X		X						nymph stage unknown
		<i>Baetis parallelus</i> Banks, 1924		X	X				X				nymph stage unknown
		<i>Baetis piscatoris</i> Traver, 1935		X	X		X						nymph stage unknown
		<i>Baetis tricaudatus</i> Dodds, 1923		X	X			X	X	X	X	X	
		<i>Baetodes</i>		X	X			X			X	Cohen and Allen (1978); McCafferty and Provonsha (1993)	
		<i>Baetodes allenii</i> McCafferty and Provonsha, 1993		X	X					X		Cohen and Allen (1978); McCafferty and Provonsha (1993)	
		<i>Baetodes arizonensis</i> Koss, 1972		X	X					X		Cohen and Allen (1978); McCafferty and Provonsha (1993); Koss (1972)	
		<i>Baetodes bibranchius</i> McCafferty and Provonsha, 1993		X	X			X				Cohen and Allen (1978); McCafferty and Provonsha (1993)	
		<i>Baetodes edmundsi</i> Koss, 1972		X	X					X		Cohen and Allen (1978); McCafferty and Provonsha (1993); Koss (1972)	
		<i>Callibaetis</i>		X	X	X		X	X	X	X		No published nymph key to species
		<i>Camelobaetidius</i>		X	X			X	X		X		Lugo-Ortiz and McCafferty (1995); McCafferty and Randolph (2000)
		<i>Camelobaetidius kickapoo</i>		X	X					X		Lugo-Ortiz and McCafferty (1995); McCafferty	

Taxonomic Hierarchy			Habitat		Distribution						Literature Cited		Comments	
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NVAZ	Baja		
			McCafferty, 2000										and Randolph (2000)	
			<i>Camelobaetidius mexicanus</i> (Traver and Edmunds, 1968)	X	X			X					Lugo-Ortiz and McCafferty (1995); McCafferty and Randolph (2000)	
			<i>Camelobaetidius musseri</i> (Traver and Edmunds, 1968)	X	X					X			Lugo-Ortiz and McCafferty (1995); McCafferty and Randolph (2000)	
			<i>Camelobaetidius warreni</i> (Traver and Edmunds, 1968)	X	X		X						Lugo-Ortiz and McCafferty (1995); McCafferty and Randolph (2000)	widespread species; <i>C. similis</i> is considered to be a synonym
			<i>Centroptilum</i>	X	X		X	X		X				No published nymph key to species
			<i>Cloeodes</i>	X	X		X			X			Waltz and McCafferty (1987)	This key includes nymphs of all three southwestern species
			<i>Cloeodes excogitatus</i> Waltz & MacCafferty, 1987	X	X		X	X			X		Waltz and McCafferty (1987)	
			<i>Cloeodes macrolamellus</i> Waltz and McCafferty, 1987	X	X						X		Waltz and McCafferty (1987)	
			<i>Cloeodes peninsulae</i> Waltz and McCafferty, 1987	X	X						X		Waltz and McCafferty (1987)	
			<i>Diphotor</i>											
			<i>Diphotor hageni</i> (Eaton, 1885)	X	X		X	X	X				Morihara and McCafferty (1979)	only one North American species
			<i>Fallceon</i>	X	X		X		X	X				
			<i>Fallceon eatoni</i> (Kimmings, 1934)	X	X						X		McCafferty (2006)	
			<i>Fallceon quilleri</i> (Dodds, 1923)	X	X		X			X			Morihara and McCafferty (1979)	only known species in CA
			<i>Paracloeodes</i>	X	X		X							only one species known in the west
			<i>Paracloeodes minutus</i> (Daggy, 1945)	X	X		X							only one species known in the west
			<i>Plauditus</i>	X	X		?	X					Lugo-Ortiz and McCafferty (1998)	
			<i>Plauditus punctiventris</i> (McDunnough, 1923)	X	X		?	X					Lugo-Ortiz and McCafferty (1998)	
			<i>Procloeon</i>	X	X		X							No published nymph key to species
			<i>Procloeon venosum</i> (Traver, 1935)	X	X		X	X						nymph stage unknown
			<i>Pseudocloeon</i>	X	X		X				X		McCafferty and Waltz (1995) Lugo-Ortiz et al. (1999)	Species formerly in <i>Labiobaetis</i>
			<i>Pseudocloeon apache</i> (McCafferty & Waltz, 1995)	X	X		?				X		McCafferty and Waltz (1995) Lugo-Ortiz et al. (1999)	
			<i>Pseudocloeon propinquum</i> (Walsh, 1863)	X	X				X				McCafferty and Waltz (1995) Lugo-Ortiz et al. (1999)	
			<i>Baetiscidae</i>	X	X								Pescador and Berner (1981)	

Taxonomic Hierarchy			Habitat		Distribution			Literature Cited				Comments		
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
		<i>Baetisca</i>	X X						X					Baumann and Kondratieff (2000)
		<i>Baetisca columbiana</i> Edmunds, 1960	X X						X					
	Caenidae		X			X								Other genera are possible in the Southwest; revision of the family underway by Sun and McCafferty
		<i>Caenis</i>	X			X								Mature nymphs may be identified to species
		<i>Caenis amica</i> Hagen, 1861	X			X X X		X						
		<i>Caenis bajaensis</i> Allen and Murvosh, 1983	X			X				X X				Provonsha (1990)
		<i>Caenis latipennis</i> Banks, 1907	X			X X X		X						Provonsha (1990)
		<i>Caenis punctata</i> McDunnough, 1931	X											Provonsha (1990)
		<i>Caenis tardata</i> McDunnough, 1931	X											
	Ephemerellidae		X			X X X								Family undergoing revision; expect changes in the near future
		<i>Attenella</i>	X			X								Allen and Edmunds (1961a)
		<i>Attenella attenuata</i> (McDunnough, 1925)	X X			X								Allen and Edmunds (1961a)
		<i>Attenella delantala</i> (Mayo, 1952)	X X			X X X								Allen and Edmunds (1961a)
		<i>Attenella margarita</i> (Needham, 1927)	X X			X X								Allen and Edmunds (1961a)
		<i>Attenella soquele</i> (Day, 1954)	X X			X X X								Allen and Edmunds (1961a)
		<i>Caudatella</i>	X X			X X								Allen and Edmunds (1961b)
		<i>Caudatella edmundsi</i> (Allen, 1959)	X X			X								Allen and Edmunds (1961b)
		<i>Caudatella heterocaudata</i> (McDunnough, 1929)	X X			X X								Allen and Edmunds (1961b)
		<i>Caudatella hystrix</i> (Traver, 1934)	X X			X X X								Allen and Edmunds (1961b) <i>Caudatella cascadia</i> (Allen and Edmunds) now a synonym
		<i>Caudatella jacobi</i> (McDunnough, 1939)	X X			X								Allen and Edmunds (1961b)
		<i>Drunella</i>	X X			X X X X X X		X						Allen and Edmunds (1962)
		<i>Drunella coloradensis</i> (Dodds, 1923)	X X			X X X X X X X		X						Allen and Edmunds (1962)
		<i>Drunella doddsii</i> (Needham, 1927)	X X			X X X X X X								Allen and Edmunds (1962)

Taxonomic Hierarchy			Habitat		Distribution				Literature Cited		Comments		
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja
			<i>Drunella flaviginea</i> (McDunnough, 1926)	X	X			X	X	X			X Allen and Edmunds (1962)
			<i>Drunella grandis</i> (Eaton, 1884)	X	X			X	X	X	X	X	Allen and Edmunds (1962)
			<i>Drunella pelosa</i> (Mayo, 1951)	X	X			X	X	X			Allen and Edmunds (1962)
			<i>Drunella spinifera</i> (Needham, 1927)	X	X			X	X	X			Allen and Edmunds (1962)
	<i>Ephemerella</i>												Allen and Edmunds (1965); Jacobus and McCafferty (2003)
			<i>Ephemerella aurivillii</i> (Bengtsson, 1908)	X	X			X	X	X			Allen and Edmunds (1965); Jacobus and McCafferty (2003)
			<i>Ephemerella dorothaea</i> (Needham, 1908)	X	X			X	X	X	X	X	Allen and Edmunds (1965); Jacobus and McCafferty (2003)
			<i>Ephemerella excrucians</i> Walsh, 1862	X	X			X	X	X	X	X	Allen and Edmunds (1965); Jacobus and McCafferty (2003)
			<i>Ephemerella maculata</i> Traver, 1934	X	X			X					Allen and Edmunds (1965); Jacobus and McCafferty (2003)
			<i>Ephemerella verruca</i> Allen and Edmunds, 1965	X	X				X	X			Allen and Edmunds (1965); Jacobus and McCafferty (2003)
	<i>Eurylophella</i>			X	X	X		X	X	X			Allen and Edmunds (1963a)
			<i>Eurylophella lodi</i> (Mayo, 1952)	X	X	X		X	X	X			Allen and Edmunds (1963a)
	<i>Serratella</i>			X				X	X	X	X	X	Allen and Edmunds (1963b)
			<i>Serratella levigata</i> (Day, 1954)	X	X			X					Allen and Edmunds (1963b)
			<i>Serratella micheneri</i> (Traver, 1934)	X	X			X	X	X		X	Allen and Edmunds (1963b)
			<i>Serratella teresa</i> (Traver, 1934)	X	X			X	X	X			Allen and Edmunds (1963b)
			<i>Serratella tibialis</i> (McDunnough, 1924)	X	X			X	X	X	X	X	Allen and Edmunds (1963b)
			<i>Serratella velmae</i> (Allen and Edmunds, 1963)	X	X			X	X				Allen and Edmunds (1963b)
	<i>Timpanoga</i>			X	X			X	X	X	X		Allen and Edmunds (1959)
			<i>Timpanoga hecuba</i> (Eaton, 1884)	X	X			X	X	X	X		Allen and Edmunds (1959)
	Ephemeridae			X				X	X	X	X		McCafferty (1975)
			<i>Ephemera</i>	X						X			McCafferty (1975)
			<i>Ephemera simulans</i> Walker, 1853	X						X			McCafferty (1975)

Taxonomic Hierarchy			Habitat		Distribution				Literature Cited		Comments		
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja
		<i>Hexagenia</i>	X			X	X	X	X				
		<i>Hexagenia bilineata</i> (Say, 1824)	X					X					
		<i>Hexagenia limbata</i> (Serville, 1829)	X			X	X	X	X				
	Heptageniidae		X			X							Family currently undergoing major revision
		<i>Cinygma</i>	X	X		X	X	X					nymphs cannot be identified to species at present
		<i>Cinygmula</i>	X	X		X	X			X			nymphs cannot be identified to species at present
		<i>Ecdyonurus</i>	X	X		X							McCafferty (2004); Bednarik and Edmunds (1980) mature nymphs may be separated using labral characters
		<i>Ecdyonurus criddlei</i> (McDunnough, 1927)	X	X		?	X	X	X	X			McCafferty (2004); Bednarik and Edmunds (1980) species formerly in Heptagenia, then Nixe
		<i>Ecdyonurus simplicoides</i> (McDunnough, 1924)	X	X		?	X			X			McCafferty (2004); Bednarik and Edmunds (1980) species formerly in Heptagenia, then Nixe
		<i>Epeorus</i>	X	X		X	X	X	X	X	X		The key in Edmunds and Allen (1964) includes only species found in the Rocky Mts. The nymph stage is unknown for several western species.
		<i>Heptagenia</i>	X	X		X							nymphs cannot be reliably separated at present
		<i>Ironodes</i>	X	X		X	X				X		nymphs cannot be reliably separated at present
		<i>Leucrocuta</i>	X	X		?	X						immature Leucrocuta/Nixe/Ecdyonurus difficult to separate
		<i>Leucrocuta jewetti</i> (Allen, 1966)	X	X			X						
		<i>Nixe</i>	X	X		X	X						immature Leucrocuta/Nixe/Ecdyonurus difficult to separate
		<i>Nixe kennedyi</i> (McDunnough, 1924)	X	X		X	X						
		<i>Rhithrogena</i>	X	X		X	X	X	X	X	X		nymphs cannot be reliably separated at present
		<i>Mccaffertium</i>	X	X				X					Wang and McCafferty (2004) formerly a subgenus of <i>Stenonema</i>
		<i>Mccaffertium terminatum</i> (Walsh, 1862)	X	X				X					Bednarik and McCafferty (1979); Wang and McCafferty (2004)
	Isonychiidae		X	X		X		X	X				
		<i>Isonychia</i>	X	X		X		X	X				Although distribution is useful for identifying Isonychia in the West, reliable species identifications require rearing
		<i>Leptohyphidae</i>	X	X		X							several new genera were erected in Wiersema and McCafferty (2000) but no species key to nymphs was included
		<i>Asioplax</i>	X	X		?							Wiersema and McCafferty (2000); Allen (1978) an unassociated species has been taken in CA
		<i>Homoleptohyphes</i>	X	X		X			X				Wiersema and McCafferty (2000); Allen (1978)
		<i>Homoleptohyphes dimorphus</i>	X	X		X			X				Wiersema and McCafferty (2000); Allen (1978)

Taxonomic Hierarchy			Habitat		Distribution			Literature Cited				Comments	
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja
		(Allen, 1967)											
		<i>Homoleptohyphes mirus</i> (Allen, 1967)	X	X						X			Wiersema and McCafferty (2000); Allen (1978)
		<i>Homoleptohyphes quercus</i> (Kilgore and Allen, 1973)	X	X						X			Wiersema and McCafferty (2000); Allen (1978)
		<i>Leptohyphes</i>	X	X						X			Wiersema and McCafferty (2000); Allen (1978)
		<i>Leptohyphes zalope</i> Traver, 1958	X	X						X			Wiersema and McCafferty (2000); Allen (1978)
		<i>Tricoryhyphes</i>	X	X						X			Wiersema and McCafferty (2000); Allen (1978)
		<i>Tricoryhyphes condylus</i> (Allen, 1967)	X	X						X			Wiersema and McCafferty (2000); Allen (1978)
		<i>Tricorythodes</i>	X	X		X				X	X		Wiersema and McCafferty (2000); Allen (1978)
		<i>Tricorythodes explicatus</i> (Eaton, 1892)	X	X						X	X		Wiersema and McCafferty (2000); Allen (1978)
		<i>Tricorythodes minutus</i> Traver, 1935	X	X		X	X	X	X	X			Wiersema and McCafferty (2000); Allen (1978)
		<i>Vaccupernius</i>	X	X						X			Wiersema and McCafferty (2000); Allen (1978)
		<i>Vaccupernius packeri</i> (Allen, 1967)	X	X						X			Wiersema and McCafferty (2000); Allen (1978)
		<i>Leptophlebiidae</i>	X		X								
		<i>Choroterpes</i>	X	X		X	X		X	X	X		McCafferty (1992)
		<i>Leptophlebia</i>	X	X	X	X	X	X					Burian (2000)
		<i>Leptophlebia cupida</i> (Say, 1823)	X					X					Burian (2000)
		<i>Leptophlebia pacifica</i> (McDunnough, 1933)	X				X						Burian (2000)
		<i>Neochoroterpes</i>	X							X			Henry (1993)
		<i>Neochoroterpes kossi</i> (Allen, 1974)	X							X			Henry (1993)
		<i>Paraleptophlebia</i>	X			X	X						Most species undescribed as nymphs; best to leave at genus. See Edmunds and McCafferty (1996) for discussion of species with tusks.
		<i>Thraulodes</i>	X	X						X			Traver and Edmunds (1967)
		<i>Thraulodes brunneus</i> Koss, 1966	X	X						X			Traver and Edmunds (1967)
		<i>Thraulodes gonzalesi</i> Traver and Edmunds, 1967	X	X						X			Traver and Edmunds (1967)

Taxonomic Hierarchy			Habitat		Distribution					Literature Cited	Comments		
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja
		<i>Thraulodes tenuilineus</i> Lugo-Ortiz and McCafferty, 1996	X	X						X			Traver and Edmunds (1967)
		<i>Traverella</i>	X	X					X	X	X		Allen (1973)
		<i>Traverella albertana</i> (McDunnough, 1931)	X	X				X	X	X			Allen (1973)
	Oligoneuriidae		X							X			Edmunds et al. (1958)
		<i>Lachlania</i>	X							X			Edmunds et al. (1958)
		<i>Lachlania saskatchewanensis</i> Ide, 1941	X							X			Edmunds et al. (1958)
	Polymitarcyidae		X				X	X	X				McCafferty (1975)
		<i>Ephoron</i>	X					X	X	X			McCafferty (1975)
		<i>Ephoron album</i> (Say, 1824)	X					X	X	X			McCafferty (1975)
	Siphlonuridae		X			X							
		<i>Edmundius</i>	X	X		X							
		<i>Edmundius agilis</i> Day 1953	X	X		X							
	Parameletus		X	X				X					
		<i>Parameletus columiae</i> McDunnough, 1938	X	X				X					
	<i>Siphlonurus</i>		X			X							

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## Odonata: Damselflies and Dragonflies

**Standard Effort Level I:** Genus

**Standard Effort Level II:** Species (where possible)

**Standard Taxonomic Reference(s):** Westfall and May (1996), Needham, Westfall and May (2000)

Keys to families and genera are given in the odonate chapter of Merritt and Cummins (Westfall and Tennessen, 1996). Updated keys, species keys to adults and immatures are given for damselflies in Westfall and May (1996) and dragonflies in Needham, Westfall and May (2000). See Rehn (2000) for more detailed ecological and distributional information on Californian odonates.

Taxonomic Hierarchy				Habitat			Distribution					Literature Cited			Comments
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
Odonata					X	X	X		X	X	X	X	X	X	
Zygoptera					X	X	X		X	X	X	X	X	X	Westfall and May (1996) Has keys for all damselflies found in the region
	Calopterygidae				X	X			X	X	X	X	X	X	Westfall and May (1996)
		Calopteryx			X	X			X	X	X				Westfall and May (1996)
			<i>Calopteryx aequabilis</i> Say, 1839		X	X			X	X	X				Relatively intolerant of pollution; rare in Northern CA Westfall and May (1996)
		Hetaerina			X	X			X			X	X	X	Westfall and May (1996)
			<i>Hetaerina americana</i> (Fabricius, 1798)		X	X			X			X	X	X	Westfall and May (1996) Relatively intolerant of pollution
			<i>Hetaerina vulnerata</i> Hagen in Selys, 1853		X	X							X		Westfall and May (1996)
	Coenagrionidae				X				X						Westfall and May (1996)
		<i>Amphiagrion</i>			X	X	X		X	X	X	X	X	X	Westfall and May (1996)
			<i>Amphiagrion abbreviatum</i> (Selys, 1876)		X	X	X		X	X	X	X	X	X	Westfall and May (1996)
		<i>Apanisagrion</i>			X								X		Westfall and May (1996)
			<i>Apanisagrion lais</i> (Brauer, 1876)		X								X		Westfall and May (1996)
	<i>Argia</i>				X	X			X	X	X	X	X	X	Westfall and May (1996)
			<i>Argia agrioides</i> Calvert, 1895		X	X			X	X			X	X	Westfall and May (1996)
			<i>Argia alberta</i> Kennedy, 1918		X	X			X	X		X	X		Westfall and May (1996) prefers seeps and springs
			<i>Argia emma</i> Kennedy, 1915		X	X			X	X	X	X			Westfall and May (1996)
			<i>Argia fumipennis</i> (Burmeister, 1839)		X								X		Westfall and May (1996)
			<i>Argia hinei</i> Kennedy, 1918		X	X			X			X	X	X	Westfall and May (1996)

Taxonomic Hierarchy				Habitat				Distribution				Literature Cited		Comments	
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
				<i>Argia immunda</i> (Hagen, 1861)	X	X			X			X	X		Westfall and May (1996)
				<i>Argia lacrimans</i> (Hagen, 1861)	X								X		Westfall and May (1996)
				<i>Argia lugens</i> (Hagen, 1861)	X	X			X	X			X	X	Westfall and May (1996)
				<i>Argia moesta</i> (Hagen, 1861)	X	X			X			X	X	X	Westfall and May (1996)
				<i>Argia munda</i> Calvert, 1902	X							X			Westfall and May (1996)
				<i>Argia nahuana</i> Calvert, 1902	X	X			X	X		X	X	X	Westfall and May (1996)
				<i>Argia oenea</i> Hagen in Selys, 1865	X								X	X	Westfall and May (1996)
				<i>Argia pallens</i> Calvert, 1902	X								X		Westfall and May (1996)
				<i>Argia pima</i> Garrison, 1994	X								X		Westfall and May (1996)
				<i>Argia plana</i> Calvert, 1902	X								X		Westfall and May (1996)
				<i>Argia sabino</i> Garrison, 1994	X								X		Westfall and May (1996)
				<i>Argia sedula</i> (Hagen, 1861)	X	X	X		X			X	X		Westfall and May (1996)
				<i>Argia tarascana</i> Calvert, 1902	X								X		Westfall and May (1996)
				<i>Argia tezpi</i> Calvert, 1902	X								X	X	Westfall and May (1996)
				<i>Argia tonto</i> Calvert, 1902	X								X		Westfall and May (1996)
				<i>Argia translata</i> Hagen in Selys, 1865	X							X	X		Westfall and May (1996)
				<i>Argia vivida</i> Hagen in Selys, 1865	X	X			X	X	X	X	X	X	Westfall and May (1996)
		<i>Coenagrion</i>			X	X			X	X	X	X	X		Westfall and May (1996)
		<i>Coenagrion resolutum</i> (Hagen in Selys, 1876)			X	X			X	X	X	X	X		Uncommon in northern Sierra lakes and bogs; larvae hard to distinguish from <i>Enallagma</i> sp.
		<i>Enallagma</i>			X	X	X		X	X	X	X	X	X	Westfall and May (1996)
		<i>Enallagma anna</i> Williamson, 1900			X	X			X	X		X	X		Westfall and May (1996)
		<i>Enallagma basidens</i> Calvert, 1902			X	X							X		Westfall and May (1996)
		<i>Enallagma boreale</i> (Selys, 1875)			X		X		X	X	X	X	X		Westfall and May (1996)
		<i>Enallagma carunculatum</i> Morse, 1895			X	X	X		X	X	X	X	X	X	Westfall and May (1996)
		<i>Enallagma civile</i> (Hagen, 1861)			X	X	X		X			X	X	X	Westfall and May (1996)
		<i>Enallagma clausum</i> Morse, 1895			X	X	X		X	X	X	X			Westfall and May (1996)
		<i>Enallagma cyathigerum</i> (Charpentier, 1835)			X		X		X	X	X	X	X	X	Westfall and May (1996)
		<i>Enallagma ebrium</i> (Hagen, 1861)			X						X				Westfall and May (1996)
		<i>Enallagma eiseni</i> Calvert, 1895			X								X		Westfall and May (1996)
		<i>Enallagma novaehispaniae</i> Calvert, 1902			X								X		Westfall and May (1996)
		<i>Enallagma praeverum</i> (Hagen, 1861)			X	X	X		X			X	X	X	Westfall and May (1996)

Taxonomic Hierarchy			Habitat		Distribution				Literature Cited		Comments				
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
				<i>Enallagma semicirculare</i> Selys, 1876	X								X		Westfall and May (1996)
				<i>Hesperagrion</i>	X								X		Westfall and May (1996)
				<i>Hesperagrion heterodoxum</i> (Selys, 1868)	X								X		Westfall and May (1996)
				<i>Ischnura</i>	X	X	X		X	X	X	X	X	X	Westfall and May (1996)
				<i>Ischnura barberi</i> Currie, 1903	X	X	X		X				X		Westfall and May (1996)
				<i>Ischnura cervula</i> Selys, 1876	X	X	X		X	X	X	X	X	X	Westfall and May (1996)
				<i>Ischnura damula</i> Calvert, 1902	X								X		Westfall and May (1996)
				<i>Ischnura demorsa</i> (Hagen, 1861)	X								X		Westfall and May (1996)
				<i>Ischnura denticollis</i> (Burmeister, 1839)	X				X	X		X	X	X	Westfall and May (1996)
				<i>Ischnura erratica</i> Calvert, 1895	X		X		X	X	X				Westfall and May (1996)
				<i>Ischnura gemina</i> (Kennedy, 1917)	X		X		X						Westfall and May (1996)
				<i>Ischnura hastata</i> (Say, 1839)	X	X	X		X				X		Westfall and May (1996)
				<i>Ischnura perparva</i> McLachlan in Selys, 1876	X	X	X		X	X	X	X	X		Westfall and May (1996)
				<i>Ischnura ramburii</i> (Selys, 1842)	X		X						X	X	Westfall and May (1996)
				<i>Nehalennia</i>	X		X		X		X				Westfall and May (1996)
				<i>Nehalennia irene</i> (Hagen, 1861)	X		X		X		X				Westfall and May (1996)
				<i>Telebasis</i>	X	X	X		X				X	X	Westfall and May (1996)
				<i>Telebasis incolamus</i> Williamson and Williamson, 1930	X								X		Westfall and May (1996)
				<i>Telebasis salva</i> (Hagen, 1861)	X	X	X		X				X	X	Westfall and May (1996)
				<i>Zoniagrion</i>	X	X			X						Westfall and May (1996)
				<i>Zoniagrion exclamationis</i> (Selys, 1876)	X	X			X						Monotypic; CA endemic
				<i>Lestidae</i>	X	X	X		X	X	X		X	X	Westfall and May (1996)
				<i>Archilestes</i>	X	X	X		X	X	X		X	X	Westfall and May (1996)
				<i>Archilestes californica</i> McLachlan, 1895	X	X	X		X	X	X		X	X	Westfall and May (1996)
				<i>Archilestes grandis</i> (Rambur, 1842)	X	X			X				X	?	Westfall and May (1996)
				<i>Lestes</i>	X	X	X		X	X	X	X	X	X	Westfall and May (1996)
				<i>Lestes alacer</i> Hagen, 1861	X								X		Westfall and May (1996)
				<i>Lestes congener</i> Hagen, 1861	X	X	X		X	X	X	X	X		Westfall and May (1996)
				<i>Lestes disjunctus</i> Selys, 1862	X		X		X	X	X	X	X		Westfall and May (1996)
				<i>Lestes dryas</i> Kirby, 1840	X		X		X	X	X	X	X		Westfall and May (1996)
															<i>Lestes disjunctus disjunctus</i> Selys

Taxonomic Hierarchy				Habitat				Distribution				Literature Cited		Comments		
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
				<i>Lestes stultus</i> Hagen, 1861	X		X		X						Westfall and May (1996)	
				<i>Lestes unguiculatus</i> Hagen, 1861	X		X		X	X	X	X			Westfall and May (1996)	
		Platystictidae											X		Westfall and May (1996); Hoekstra and Garrison (1999)	very restricted locality
				<i>Palaemnema</i>									X		Westfall and May (1996); Hoekstra and Garrison (1999)	very restricted locality
				<i>Palaemnema domina</i> Calvert, 1905	X								X		Westfall and May (1996); Hoekstra and Garrison (1999)	very restricted locality
	Anisoptera				X	X	X		X	X	X	X	X	X	Needham, Westfall and May (2000)	
		Aeshnidae			X	X	X		X	X	X	X	X	X	Needham, Westfall and May (2000)	
				<i>Aeshna</i>	X	X	X		X						Needham, Westfall and May (2000)	Even late instar larvae are difficult to distinguish and should be left at genus
				<i>Anax</i>	X	X	X		X	X	X	X	X	X	Needham, Westfall and May (2000)	
				<i>Anax junius</i> (Drury, 1770)	X	X	X		X	X	X	X	X	X	Needham, Westfall and May (2000)	
				<i>Anax walsinghami</i> McLachlan, 1882	X	X			X			X	X	X	Needham, Westfall and May (2000)	
				<i>Oploonaeshna</i>	X				X				X		Needham, Westfall and May (2000)	
				<i>Oploonaeshna armata</i> (Hagen, 1861)	X				X				X		Needham, Westfall and May (2000)	Only one CA record from Water Canyon in Inyo County
				<i>Remartinia</i>	X								X		Needham, Westfall and May (2000)	
				<i>Remartinia luteipennis</i> (Burmeister, 1839)	X								X		Needham, Westfall and May (2000)	
		Cordulegastridae			X	X			X	X	X	X	X	X	Needham, Westfall and May (2000)	
				<i>Cordulegaster</i>	X	X			X	X	X	X	X	X	Needham, Westfall and May (2000)	
				<i>Cordulegaster diadema</i> Selys, 1868	X								X		Needham, Westfall and May (2000)	
				<i>Cordulegaster dorsalis</i> (Hagen in Selys, 1858)	X				X	X	X	X			Needham, Westfall and May (2000)	
		Corduliidae			X	X	X		X	X	X	X	X		Needham, Westfall and May (2000)	Corduliids unlikely in samples collected by CSBP

Taxonomic Hierarchy				Habitat				Distribution					Literature Cited	Comments	
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
			<i>Cordulia</i>		X		X		X	X	X	X		Needham, Westfall and May (2000)	
			<i>Cordulia shurtleffii</i> Scudder, 1861		X		X		X	X	X	X		Needham, Westfall and May (2000)	Northern CA ponds and lakes at higher elevations
			<i>Epitheca</i>		X	X	X		X	X	X			Needham, Westfall and May (2000)	
			<i>Epitheca canis</i> (McLachlan, 1886)		X	X	X		X	X	X			Needham, Westfall and May (2000)	Lakes and slower sections of Northern CA streams
			<i>Epitheca spinigera</i> (Selys, 1871)		X					X	X			Needham, Westfall and May (2000)	as <i>Tetragoneuria</i> in some lists
			<i>Somatochlora</i>		X		X		X	X	X	X	X	Needham, Westfall and May (2000)	boggy marshes and lakes at higher elevation in Northern CA; uncommon
			<i>Somatochlora albicincta</i> (Burmeister, 1839)		X				X	X	X			Needham, Westfall and May (2000)	
			<i>Somatochlora minor</i> Calvert, 1898		X					X	X			Needham, Westfall and May (2000)	
			<i>Somatochlora semicircularis</i> (Selys, 1871)		X				X	X	X	X		Needham, Westfall and May (2000)	
		<i>Gomphidae</i>			X	X	X		X	X	X	X	X	Needham, Westfall and May (2000)	
			<i>Erpetogomphus</i>		X				X	X	X	X	X	Needham, Westfall and May (2000)	
			<i>Erpetogomphus compositus</i> Hagen in Selys, 1858		X	X			X	X	X	X	X	Needham, Westfall and May (2000)	
			<i>Erpetogomphus crotalinus</i> (Hagen in Selys, 1854)		X								X	Needham, Westfall and May (2000)	
			<i>Erpetogomphus designatus</i> Hagen in Selys, 1858		X							X	X	Needham, Westfall and May (2000)	
			<i>Erpetogomphus lampropeltis</i> Kennedy, 1918		X				X				X	Needham, Westfall and May (2000)	
			<i>Gomphus</i>		X	X	X		X	X	X	X		Needham, Westfall and May (2000)	
			<i>Gomphus graslinellus</i> Walsh, 1862		X						X			Needham, Westfall and May (2000)	
			<i>Gomphus kurilis</i> (Hagen in Selys, 1858)		X	X	X		X	X	X	X		Needham, Westfall and May (2000)	Northern CA streams; rarely in lakes
			<i>Gomphus lineatifrons</i> Calvert, 1921		X					X	X			Needham, Westfall and May (2000)	

Taxonomic Hierarchy				Habitat				Distribution				Literature Cited		Comments	
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
			<i>Octogomphus</i>		X				X	X	X	X		X	Needham, Westfall and May (2000)
			<i>Octogomphus specularis</i> Hagen, 1859		X				X	X	X	X		X	Needham, Westfall and May (2000)
			<i>Ophiogomphus</i>		X	X			X	X	X	X	X		Needham, Westfall and May (2000)
			<i>Ophiogomphus arizonicus</i> Kennedy, 1917		X									X	Needham, Westfall and May (2000)
			<i>Ophiogomphus bison</i> Selys, 1873		X	X			X	X			X		Needham, Westfall and May (2000)
			<i>Ophiogomphus morrisoni</i> Selys, 1879		X	X			X	X			X		Needham, Westfall and May (2000)
			<i>Ophiogomphus occidentis</i> Hagen, 1883		X	X			X	X	X	X			Needham, Westfall and May (2000)
			<i>Ophiogomphus severus</i> Hagen, 1874		X				X	X	X	X			Needham, Westfall and May (2000)
			<i>Progomphus</i>		X	X			X	X				X	Needham, Westfall and May (2000)
			<i>Progomphus borealis</i> McLachlan in Selys, 1873		X	X			X	X				X	Needham, Westfall and May (2000)
			<i>Stylurus</i>		X	X			X	X	X	X	X		Needham, Westfall and May (2000)
			<i>Stylurus intricatus</i> (Hagen in Selys, 1858)		X	X			X				X	X	Needham, Westfall and May (2000)
			<i>Stylurus olivaceus</i> (Selys, 1873)		X	X			X	X	X	X	X		Needham, Westfall and May (2000)
			<i>Stylurus plagiatus</i> (Selys, 1854)		X	X			X					X	Needham, Westfall and May (2000)
		<i>Libellulidae</i>			X				X						Needham, Westfall and May (2000)
		<i>Brachymesia</i>			X	X			X					X	Needham, Westfall and May (2000)
		<i>Brachymesia furcata</i> (Hagen, 1861)			X	X			X					X	Needham, Westfall and May (2000)
		<i>Brachymesia gravida</i> (Calvert, 1890)			X									X	Needham, Westfall and May (2000)
		<i>Brechmorhoga</i>			X	X			X					X	Needham, Westfall and May (2000)
															Southern California ponds

Taxonomic Hierarchy				Habitat				Distribution					Literature Cited	Comments	
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
				<i>Brechmorhoga mendax</i> (Hagen, 1861)	X	X			X				X		Needham, Westfall and May (2000) Deep crenulations in labial palps make this key to Corduliidae in Merritt and Cummins
				<i>Brechmorhoga pertinax</i> (Hagen, 1861)	X								X		Needham, Westfall and May (2000) stray only? Not a breeding population
		<i>Dythemis</i>			X								X	X	Needham, Westfall and May (2000)
				<i>Dythemis fugax</i> Hagen, 1861	X								X		Needham, Westfall and May (2000)
				<i>Dythemis nigrescens</i> Calvert, 1899	X								X	X	Needham, Westfall and May (2000)
				<i>Dythemis velox</i> Hagen, 1861	X								X		Needham, Westfall and May (2000)
		<i>Erythemis</i>			X				X	X	X	X	X	X	Needham, Westfall and May (2000)
				<i>Erythemis collacata</i> (Hagen, 1861)	X				X	X	X	X	X	X	Needham, Westfall and May (2000)
				<i>Erythemis simplicicollis</i> (Say, 1839)	X								X		Needham, Westfall and May (2000)
				<i>Erythemis vesiculosa</i> (Fabricius, 1775)	X								X		Needham, Westfall and May (2000)
		<i>Erythrodiplax</i>			X			?					X	X	Needham, Westfall and May (2000)
				<i>Erythrodiplax basifusca</i> (Calvert, 1895)	X								X	X	Needham, Westfall and May (2000)
				<i>Erythrodiplax funerea</i> (Hagen, 1861)	X			?					X		Needham, Westfall and May (2000)
		<i>Ladona</i>			X	X			X	X	X				Needham, Westfall and May (2000)
				<i>Ladona julia</i> (Uhler, 1857)	X	X			X	X	X				Needham, Westfall and May (2000)
		<i>Leucorrhinia</i>			X	X			X	X	X	X			Needham, Westfall and May (2000)
				<i>Leucorrhinia borealis</i> Hagen, 1890	X						X				Needham, Westfall and May (2000)
				<i>Leucorrhinia glacialis</i> Hagen, 1890	X	X			X	X	X	X			Needham, Westfall and May (2000)
				<i>Leucorrhinia hudsonica</i> (Selys, 1850)	X	X			X	X	X	X	X		Needham, Westfall and May (2000)

Taxonomic Hierarchy				Habitat				Distribution					Literature Cited	Comments		
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
				<i>Leucorrhinia intacta</i> (Hagen, 1861)	X		X		X	X	X	X		Needham, Westfall and May (2000)		
				<i>Leucorrhinia proxima</i> Calvert, 1890	X		X		X		X			Needham, Westfall and May (2000)		
		<i>Libellula</i>			X	X	X		X	X	X	X	X	Needham, Westfall and May (2000)		
				<i>Libellula comanche</i> Calvert, 1861	X	X			X	X		X	X	Needham, Westfall and May (2000)	restricted to seeps and springs	
				<i>Libellula composita</i> (Hagen, 1873)	X	X			X	X		X	X	Needham, Westfall and May (2000)	restricted to seeps and springs	
				<i>Libellula croceipennis</i> Selys, 1868	X	X			X			X		Needham, Westfall and May (2000)	restricted to seeps and springs	
				<i>Libellula forensis</i> Hagen, 1861	X	X			X	X	X	X	X	Needham, Westfall and May (2000)		
				<i>Libellula luctuosa</i> Burmeister, 1839	X				X	X	X		X	Needham, Westfall and May (2000)		
				<i>Libellula nodisticta</i> Hagen, 1861	X	X			X	X		X	X	Needham, Westfall and May (2000)	prefers seeps and springs	
				<i>Libellula pulchella</i> Drury, 1770	X		X		X	X	X	X	X	Needham, Westfall and May (2000)		
				<i>Libellula quadrimaculata</i> Linnaeus, 1758	X		X		X	X	X	X	X	Needham, Westfall and May (2000)		
				<i>Libellula saturata</i> Uhler, 1857	X	X	X		X	X		X	X	Needham, Westfall and May (2000)		
		<i>Macrodipax</i>			X		X		X				X	X	Needham, Westfall and May (2000)	
				<i>Macrodipax balteata</i> (Hagen, 1861)	X		X		X			X	X	Needham, Westfall and May (2000)	desert spring-fed marshes	
		<i>Macrothemis</i>			X								X		Needham, Westfall and May (2000)	
				<i>Macrothemis inacuta</i> Calvert, 1898	X							X		Needham, Westfall and May (2000)		
		<i>Orthemis</i>			X		X		X			X	X	Needham, Westfall and May (2000)		
				<i>Orthemis ferruginea</i> (Fabricius, 1775)	X		X		X			X	X	Needham, Westfall and May (2000)		
		<i>Pachydipax</i>			X				X	X	X	X	X	Needham, Westfall and May (2000)	monotypic	

Taxonomic Hierarchy				Habitat				Distribution				Literature Cited	Comments		
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
				<i>Pachydiplax longipennis</i> (Burmeister, 1839)	X				X	X	X	X	X		Needham, Westfall and May (2000) monotypic
				<i>Paltothemis</i>	X	X			X				X	X	Needham, Westfall and May (2000)
				<i>Paltothemis lineatipes</i> Karsch, 1890	X	X			X				X	X	Needham, Westfall and May (2000) Deep crenulations in labial palps make this key to Corduliidae in Merritt and Cummins
				<i>Pantala</i>	X				X	X	X	X	X	X	Needham, Westfall and May (2000)
				<i>Pantala flavescens</i> (Fabricius, 1798)	X				X	X	X	X	X		Needham, Westfall and May (2000)
				<i>Pantala hymenaea</i> (Say, 1839)	X				X	X	X	X	X	X	Needham, Westfall and May (2000)
				<i>Perithemis</i>	X		X		X					X	Needham, Westfall and May (2000)
				<i>Perithemis domitia</i> (Drury, 1773)	X									X	Needham, Westfall and May (2000)
				<i>Perithemis intensa</i> Kirby, 1889	X		X		X					X	Needham, Westfall and May (2000)
				<i>Perithemis tenera</i> (Say, 1839)	X									X	Needham, Westfall and May (2000)
				<i>Plathemis</i>	X	X	X		X	X	X	X	X		Needham, Westfall and May (2000)
				<i>Plathemis lydia</i> (Drury, 1770)	X	X	X		X	X	X	X	X		Needham, Westfall and May (2000)
				<i>Plathemis subornata</i> Hagen, 1861	X	X	X		X	X		X	X		Needham, Westfall and May (2000)
				<i>Pseudoloeon</i>	X									X	Needham, Westfall and May (2000) monotypic
				<i>Pseudoleon superbus</i> (Hagen, 1861)	X									X	Needham, Westfall and May (2000) monotypic
				<i>Sympetrum</i>	X	X	X		X	X	X	X	X	X	Needham, Westfall and May (2000)
				<i>Sympetrum corruptum</i> (Hagen, 1861)	X	X	X		X	X	X	X	X	X	Needham, Westfall and May (2000)
				<i>Sympetrum costiferum</i> (Hagen, 1861)	X		X		X	X	X	X			Needham, Westfall and May (2000)
				<i>Sympetrum danae</i> (Sulzer, 1776)	X		X		X	X	X	X	X		Needham, Westfall and May (2000)

Taxonomic Hierarchy				Habitat				Distribution					Literature Cited	Comments		
Order	Suborder	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
				<i>Sympetrum illotum</i> (Hagen, 1861)	X	X	X		X	X	X	X		Needham, Westfall and May (2000)		
				<i>Sympetrum internum</i> Montgomery, 1911	X	X	X		X	X	X	X		Needham, Westfall and May (2000)		
				<i>Sympetrum madidum</i> (Hagen, 1861)	X	X	X		X	X	X	X		Needham, Westfall and May (2000)		
				<i>Sympetrum obtrusum</i> (Hagen, 1867)	X		X		X	X	X	X		Needham, Westfall and May (2000)		
				<i>Sympetrum occidentale</i> Bartenev, 1911	X	X	X		X	X	X	X	X	Needham, Westfall and May (2000)	three recognized subspecies	
				<i>Sympetrum pallipes</i> (Hagen, 1874)	X	X	X		X	X	X	X	X	Needham, Westfall and May (2000)		
				<i>Sympetrum signiferum</i> Cannings and Garrison, 1991	X								X	Needham, Westfall and May (2000)		
				<i>Sympetrum vicinum</i> (Hagen, 1861)	X		X			X	X			Needham, Westfall and May (2000)		
		<i>Tramea</i>			X	X	X		X	X	X	X	X	X	Needham, Westfall and May (2000)	
				<i>Tramea lacerata</i> Hagen, 1861	X	X	X		X	X	X	X	X		Needham, Westfall and May (2000)	
				<i>Tramea onusta</i> Hagen, 1861	X	X	X		X				X	X	Needham, Westfall and May (2000)	
		Macromiidae			X				X						Needham, Westfall and May (2000)	
				<i>Macromia</i>	X				X	X	X	X	X		Needham, Westfall and May (2000)	
				<i>Macromia magnifica</i> McLachlan in Selys, 1874	X				X	X	X	X	X		Needham, Westfall and May (2000)	Northern CA foothills and coast ranges
		Petaluridae			X				X	X	X	X			Needham, Westfall and May (2000)	
				<i>Tanypteryx</i>	X				X	X	X	X			Needham, Westfall and May (2000)	Rare and localized in seeps and springs
				<i>Tanypteryx hageni</i> (Selys)	X				X	X	X	X			Needham, Westfall and May (2000)	Rare and localized in seeps and springs

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## Plecoptera: Stoneflies

**Standard Effort Level I:** Genus

**Standard Effort Level II:** Species (where possible)

**Standard Taxonomic Reference:** Stewart and Stark (2002)

Nymphs may be identified to family and genus using Stewart and Stark (2002) or the chapter in Merritt and Cummins (Stewart and Harper, 1996), which also provides keys to adults. Although species keys exist for the adults of many families and genera in the West, many nymphs remain undescribed. Early instar nymphs of Capniidae can be very difficult to identify to genus; it is recommended that only mature nymphs be identified beyond Capniidae. Many genera and species of Capniidae, Leuctridae, Nemouridae and Taeniopterygidae are underrepresented in benthic samples because they emerge during the winter months or they prefer ephemeral habitats. Jewett (1959, 1960) are good sources of information on adult taxonomy. A current species list and distribution for stoneflies, The North American Stonefly List, is maintained by B.P. Stark and R.W. Baumann on the Monte L. Bean Museum website.

Taxonomic Hierarchy				Habitat		Distribution						Literature Cited		Comments			
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
	Plecoptera				X	X	X		X	X	X	X	X	X	X	Stewart and Stark (2002) most recent keys to families and genera in Stewart and Start (200)	
		Euholognatha															
		Capniidae			X	X			X	X	X	X	X	X	X	Nymphs notoriously difficult to separate even to genus; immature specimens should probably all be left at Capniidae	
			<i>Bolshecapnia</i>		X	X			X							Stewart and Stark (2002)	
				<i>Bolshecapnia maculata</i> (Jewett, 1954)	X	X			X							known only from CA	
			<i>Capnia</i>		X	X			X	X	X	X	X	X	X	Nelson and Baumann (1989) nymphs are not separable to species	
			<i>Capnura</i>		X	X			X	X	X	X	X			nymphs not separable to species	
				<i>Eucapnopsis brevicauda</i> Claassen, 1924	X	X			X	X	X	X	X			only one North American species	
			<i>Isocapnia</i>		X	X			X	X	X				Zenger and Baumann, 2004	nymphs not separable to species	
			<i>Mesocapnia</i>		X	X			X	X	X			X		nymphs not separable to species	
			<i>Paracapnia</i>		X	X			X	X	X					Stark and Baumann (2004)	nymphs not separable to species
			<i>Utacapnia</i>		X	X			X	X	X	X					nymphs not separable to species

Taxonomic Hierarchy				Habitat				Distribution					Literature Cited		Comments		
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
		Leuctridae							X								
			<i>Calileuctra</i>		X	X				X						Shepard and Baumann (1995)	found in intermittent streams; nymphs not separable to species
				<i>Calileuctra dobryi</i> Shepard and Baumann, 1995		X	X			X						Shepard and Baumann (1995)	found in intermittent streams
				<i>Calileuctra ephemera</i> Shepard and Baumann, 1995		X	X			X						Shepard and Baumann (1995)	found in intermittent streams
		Despaxia			X	X			X	X	X						monotypic
			<i>Despaxia augusta</i> (Banks, 1907)		X	X			X	X	X						monotypic
		Megaleuctra			X	X			X	X	X						nymphs not separable to species
			<i>Moselia infuscata</i> (Claassen, 1923)		X	X			X	X	X	X					monotypic
		Paraleuctra			X	X			X	X	X	X					nymphs not separable to species
		Perlomyia			X	X			X	X	X						nymphs not separable to species
		Pomoleuctra			X	X			X	X						Stark and Kyzar (2001)	formerly in Paraleuctra; nymphs not separable to species
	Nemouridae																
		<i>Amphinemura</i>			X	X											nymphs not separable to species
		<i>Lednia</i>															
			<i>Lednia tumana</i> (Ricker, 1952)		X	X					X						monotypic
		<i>Malenka</i>			X	X			X	X	X	X	X	X			nymphs not separable to species
		<i>Nanonemoura</i>															
			<i>Nanonemoura wahkeena</i> (Jewett, 1954)		X	X			X								monotypic; known only from type locality
		<i>Nemoura</i>															
			<i>Nemoura spiniloba</i> Jewett, 1954		X	X			X								only one species in western North America
		<i>Ostrocerca</i>			X	X			?	X	X						nymphs not separable to species; unpublished record for CA
		<i>Podmosta</i>			X	X			X	X	X	X					nymphs not separable to species
		<i>Prostoia</i>															
			<i>Prostoia besametsa</i> (Ricker, 1952)		X	X			X	X	X	X					only one species in western North America
		<i>Soyedina</i>			X	X			X	X	X	X					nymphs not separable to species
		<i>Visoka</i>															
			<i>Visoka cataractae</i> (Neave, 1933)		X	X			X	X	X						monotypic

Taxonomic Hierarchy				Habitat				Distribution					Literature Cited		Comments		
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
		Zapada			X X				X X X X							Baumann et al. (1977)	key to nymphs of three species (cinctipes, columbiana and frigida); remaining species key to oregonensis group
			Zapada cinctipes (Banks, 1897)		X X				X X X X							Baumann et al. (1977)	
			Zapada oregonensis group sensu Baumann et al. (1977)		X X				X X X X								
				Zapada columbiana (Claassen, 1923)	X X				X X X							Baumann et al. (1977)	
				Zapada frigida (Claassen, 1923)	X X				X X X X							Baumann et al. (1977)	
		Taeniopterygidae			X X				X X X X X X								
			Doddsia		X X				X X X X								monotypic
				Doddsia occidentalis (Banks, 1900)	X X				X X X X								monotypic
			Oemopteryx		X X				X								only described species in region
				Oemopteryx vanduzea (Claassen, 1937)	X X				X								only described species in region
			Taenionema		X X				X X X X X X								nymphs not separable to species
			Taeniopteryx		X X				X X X								only species in region
				Taeniopteryx nivalis (Fitch, 1847)	X X				X X X								only species in region
	Systellognatha																
		Chloroperlidae			X X				X X X X X X							Surdick (1985)	
			Alloperla		X X				X X X X								nymphs not separable to species
			Bisancora		X X				X X								nymphs not separable to species
			Haploperla		X X				X X X								only species in western North America
				Haploperla chilnualna (Ricker, 1952)	X X				X X X								only species in western North America
			Kathroperla		X X				X X X X								nymphs not separable to species
			Paraperla		X X				X X X								nymphs not separable to species
			Plumiperla		X X				X X X X								nymphs not separable to species
			Sasquaperla		X X				X								monotypic
				Sasquaperla hoopae Stark and Baumann, 2001	X X				X								monotypic
			Suwalla		X X				X X X X X X								nymphs not separable to species
			Sweltsa		X X				X X X X X X								nymphs not separable to species; 9 of 21 western species nymphs described
			Triznaka		X X				X X X X X X								nymphs not separable to species

Taxonomic Hierarchy				Habitat				Distribution					Literature Cited		Comments			
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja			
					<i>Utaperla</i>	X	X					X					only species found in western North America	
					<i>Utaperla sopladora</i> Ricker, 1952	X	X					X					only species found in western North America	
					<i>Peltoperlidae</i>	X	X			X	X	X	X					
					<i>Sierraperla</i>	X	X			X	X		X				monotypic	
					<i>Sierraperla cora</i> (Needham and Smith, 1916)	X	X			X	X		X				monotypic	
					<i>Soliperla</i>	X	X			X	X	X	X			Stark (1983)	nymphal key includes only 4 of the 7 known species	
					<i>Yoraperla</i>	X	X			X	X	X	X			Stark and Nelson (1994)	nymphs for all four North American species described and keyed	
					<i>Yoraperla brevis</i> (Banks, 1907)	X	X				X					Stark and Nelson (1994)		
					<i>Yoraperla mariana</i> (Ricker, 1943)	X	X			X	X	X				Stark and Nelson (1994)		
					<i>Yoraperla nigrisoma</i> (Banks, 1948)	X	X			X	X	X	X			Stark and Nelson (1994)		
					<i>Yoraperla siletz</i> Stark and Nelson, 1994	X	X			X	X	X				Stark and Nelson (1994)		
					<i>Perlidae</i>	X	X			X	X	X	X	X				
					<i>Anacroneuria</i>	X	X							X				
					<i>Anacroneuria wipukupa</i> Baumann and Olson, 1984	X	X							X				
					<i>Calineuria</i>	X	X			X	X	X						
					<i>Calineuria californica</i> (Banks, 1905)	X	X			X	X	X						
					<i>Claassenia</i>	X	X			X	X	X		X				
					<i>Claassenia sabulosa</i> (Banks, 1900)	X	X			X	X	X		X				
					<i>Doroneuria</i>	X	X			X	X	X	X					
					<i>Doroneuria baumanni</i> Stark and Gaufin, 1974	X	X			X	X	X	X					
					<i>Hesperoperla</i>	X	X			X	X	X	X	X			nymphs of the two species easily separable	
					<i>Hesperoperla hoguei</i> Baumann and Stark, 1980	X	X			X						Baumann and Stark (1980)		
					<i>Hesperoperla pacifica</i> (Banks, 1900)	X	X			X	X	X	X	X		Stewart and Stark (2002)		
					<i>Perlodidae</i>	X	X			X	X	X	X	X	X			
					<i>Baumannella</i>	X	X			X						Stark and Stewart (1985)	monotypic	
					<i>Baumannella alameda</i> (Needham and	X	X			X						Stark and Stewart (1985)	monotypic	

Taxonomic Hierarchy				Habitat				Distribution					Literature Cited		Comments		
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
					Claassen, 1925)												
					<i>Calliperla</i>	X	X			X	X	X					monotypic
					<i>Calliperla luctuosa</i> (Banks, 1906)	X	X			X	X	X					monotypic
					<i>Cascadoperla</i>	X	X			X	X	X				Szczytko and Stewart (1979)	monotypic
					<i>Cascadoperla trictura</i> (Hoppe, 1938)	X	X			X	X	X				Szczytko and Stewart (1979)	monotypic
					<i>Chernokrilus</i>	X	X			X	X						nymphs are not separable to species
					<i>Cosumnoperla</i>	X	X			X						Szczytko and Bottorff (1987)	monotypic
					<i>Cosumnoperla hypocrena</i> Szczytko and Bottorff, 1987	X	X			X						Szczytko and Bottorff (1987)	monotypic
					<i>Cultus</i>	X	X			X	X	X		X			
					<i>Diura</i>	X	X			X	X		X				
					<i>Diura knowltoni</i> (Frison, 1937)	X	X			X	X		X				
					<i>Frisonia</i>	X	X			X	X	X	X				
					<i>Frisonia picticeps</i> (Hanson, 1942)	X	X			X	X	X	X				
					<i>Isogenoides</i>	X	X			X		X		X		Sandberg and Stewart (2005)	key given for nymphs to all species of <i>Isogenoides</i>
					<i>Isogenoides colubrinus</i> (Hagen, 1874)	X	X			X				X		Sandberg and Stewart (2005)	
					<i>Isogenoides elongatus</i> (Hagen, 1874)	X	X					X		X		Sandberg and Stewart (2005)	
					<i>Isogenoides zionensis</i> Hanson, 1949	X	X							X		Sandberg and Stewart (2005)	
					<i>Isoperla</i>	X	X			X	X	X	X	X	X	Szczytko and Stewart (1979); Bottorff et al. (1990); Szczytko and Stewart (2002)	not all western <i>Isoperla</i> species described as nymphs
					<i>Kogotus</i>	X	X			X	X	X					immature specimens have secondary lacinial tooth which makes ID to genus difficult; immature <i>Kogotus</i> and <i>Rickeria</i> difficult to separate
					<i>Kogotus nonus</i> (Needham and Claassen, 1925)	X	X			X	X	X					only species in the region
					<i>Megarcys</i>	X	X			X	X	X	X				nymphs not separable to species
					<i>Oroperla</i>	X	X			X							monotypic
					<i>Oroperla barbara</i> Needham, 1933	X	X			X							monotypic
					<i>Osobenus</i>	X	X			X	X	X					monotypic
					<i>Osobenus yakimae</i> (Hoppe, 1938)	X	X			X	X	X					monotypic

Taxonomic Hierarchy				Habitat				Distribution					Literature Cited		Comments		
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
					<i>Perlinodes</i>	X	X			X	X	X					monotypic
					<i>Perlinodes aurea</i> (Smith, 1917)	X	X			X	X	X					monotypic
					<i>Pictetiella</i>	X	X					X					
					<i>Pictetiella lechleitneri</i> Stark and Kondratieff, 2004	X	X					X				Stark and Kondratieff (2004)	found only in Mt. Ranier, WA area
					<i>Rickera</i>	X	X			X	X	X	X				monotypic
					<i>Rickera sorpta</i> (Needham and Claassen, 1925)	X	X			X	X	X	X				monotypic
					<i>Salmoperla</i>	X	X			X							monotypic
					<i>Salmoperla sylvanica</i> Baumann and Lauck, 1987	X	X			X							monotypic
					<i>Setvena</i>	X	X			X	X					Stewart and Stanger (1985)	key to nymphs of all three known species
					<i>Setvena tibialis</i> (Banks, 1914)	X	X			X	X						
					<i>Setvena wahkeena</i> Stewart and Stanger, 1985	X	X			X							
					<i>Skwala</i>	X	X			X	X	X	X	X	Zwick (1989)	nymphs of the two species are not separable	
					<i>Susulus</i>	X	X			X						Bottorff et al. (1989)	monotypic
					<i>Susulus venustus</i> (Jewett, 1965)	X	X			X						Bottorff et al. (1989)	monotypic
					<i>Pteronarcyidae</i>	X	X			X	X	X	X	X			
					<i>Pteronarcella</i>	X	X			X	X	X	X	X	Baumann et al. (1977)	key to nymphs of both species	
					<i>Pteronarcella badia</i> (Hagen, 1874)	X	X			X		X	X				
					<i>Pteronarcella regularis</i> (Hagen, 1874)	X	X			X	X	X	X				
					<i>Pteronarcys</i>	X	X			X	X	X	X	X	Baumann et al. (1977)	key to nymphs of both species	
					<i>Pteronarcys californica</i> Newport, 1851	X	X			X	X	X		X			
					<i>Pteronarcys princeps</i> Banks, 1907	X	X			X	X	X	X				

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## Hemiptera (Suborder Heteroptera): True Bugs

**Standard Effort Level I:** Genus

**Standard Effort Level II:** Species

**Standard Taxonomic Reference(s):** Polhemus (1996)

Keys to families and genera are provided in Merritt and Cummins (Polhemus, 1996). The best regional text for all families remains Menke (ed.) (1979), which gives keys to all genera and species then known to occur in California. Stonedahl and Lattin (1986) surveyed the Corixidae for Oregon and Washington. This revision of the STE includes only those families that have traditionally been included in benthic datasets.

Taxonomic Hierarchy				Species	Habitat			Estuarine	Distribution			NV	AZ	Baja	Literature Cited	Comments
Order	Suborder	Infraorder	Family		Subfamily	Tribe	Genus		Benthic	Lotic	Lentic	CA	OR	WA		
Hemiptera																
	Heteroptera															Menke et al. (1979)
		Nepomorpha							X	X	X	X	X			
			Belostomatidae						X				X			Menke (1979)
				Abedus					X					X		Menke (1979)
							<i>Abedus breviceps</i> Stal, 1862	X						X		Menke (1979)
							<i>Abedus herberti</i> Hidalgo, 1935	X						X		Menke (1979)
							<i>Abedus indentatus</i> (Haldeman, 1854)	X			X					Menke (1979)
							<i>Abedus ovatus</i> Stal, 1862	X						X		Menke (1979)
							<i>Abedus parkeri</i> Menke, 1966	X						X		Menke (1979)
							<i>Abedus vicinus</i> Mayr, 1871	X						X		Menke (1979)
				Belostoma				X			X	X		X	X	Menke (1979)
							<i>Belostoma bakeri</i> Montandon, 1913	X			X	X		X	X	Menke (1979)
							<i>Belostoma confusum</i> Lauck, 1959	X							X	Menke (1979)
							<i>Belostoma flumineum</i> Say, 1832	X			X	X		X	X	Menke (1979)
							<i>Belostoma saratogae</i> Menke, 1958	X			X					Menke (1979) known only from Saratoga Spring, Death Valley, CA

Taxonomic Hierarchy						Habitat		Distribution					Literature Cited		Comments				
Order	Suborder	Infrarorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
							<i>Belostoma subspinosum</i> (Palisot, 1820)	X			X				X			Menke (1979)	
						<i>Lethocerus</i>		X			X	X	X	X	X			Goodwyn (2006)	
							<i>Lethocerus americanus</i> (Leidy, 1847)	X			X	X	X	X				Goodwyn (2006)	
							<i>Lethocerus angustipes</i> (Mayr, 1871)	X			X				X			Goodwyn (2006)	known in the U.S. only from Saratoga Spring, Death Valley, CA; also found in Mexico
							<i>Lethocerus medius</i> (Guerin-Meneville, 1857)	X								X		Goodwyn (2006)	
				Corixidae				X	X	X	X	X	X	X	X	X	X	Polhemus (1996); Hungerford (1948); Lauck (1979); Stonedahl and Lattin (1986)	
				Corixinae				X	X	X	X	X	X	X	X	X	X	Polhemus (1996); Hungerford (1948); Lauck (1979); Stonedahl and Lattin (1986)	
				Corixini				X	X	X	X	X	X	X	X	X	X	Polhemus (1996); Hungerford (1948); Lauck (1979); Stonedahl and Lattin (1986)	
						<i>Arctocorisa</i>		X		X	?							Hungerford (1948)	high elevation ponds
							<i>Arctocorisa sutilis</i> (Uhler, 1876)	X		X	?							Hungerford (1948)	unpublished record for CA
						<i>Callicorixa</i>		X			X	X	X	X				Stonedahl and Lattin (1986)	
							<i>Callicorixa alaskensis</i> Hungerford, 1926	X					X					Stonedahl and Lattin (1986)	
							<i>Callicorixa audeni</i> Hungerford, 1928	X			X	X	X	X				Stonedahl and Lattin (1986)	
							<i>Callicorixa scudderi</i> Jansson, 1979	X				X	X					Stonedahl and Lattin (1986)	
							<i>Callicorixa vulnerata</i> (Uhler, 1861)	X			X	X	X					Stonedahl and Lattin (1986)	
						<i>Cenocorixa</i>		X			X	X	X					Hungerford (1948)	
							<i>Cenocorixa andersoni</i> Hungerford, 1948	X				X	X					Hungerford (1948)	

Taxonomic Hierarchy					Species	Habitat			Distribution			NV	AZ	Baja	Literature Cited	Comments	
Order	Suborder	Infrarorder	Family	Subfamily	Tribe	Genus	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA				
						<i>Cenocorixa bifida</i> (Hungerford, 1926)	X						X			Hungerford (1948)	as <i>C. bifida hungerfordi</i> Lansbury, 1960
						<i>Cenocorixa blaisdelli</i> (Hungerford, 1930)	X				X		X			Hungerford (1948)	
						<i>Cenocorixa expleta</i> (Uhler, 1895)	X						X			Hungerford (1948)	
						<i>Cenocorixa kuiterti</i> Hungerford, 1948	X				X					Hungerford (1948)	
						<i>Cenocorixa utahensis</i> (Hungerford, 1925)	X				X	X		X	X	Hungerford (1948)	
						<i>Cenocorixa wileyae</i> (Hungerford, 1926)	X				X	X	X	X	X	Hungerford (1948)	
						<i>Corisella</i>	X				X	X	X	X	X	Hungerford (1948)	
						<i>Corisella decolor</i> (Uhler, 1871)	X				X	X			X	Hungerford (1948)	
						<i>Corisella edulis</i> (Champion, 1901)	X				X				X	Hungerford (1948)	
						<i>Corisella inscripta</i> (Uhler, 1894)	X				X	X	X		X	Hungerford (1948)	
						<i>Corisella tarsalis</i> (Fieber, 1851)	X				X				X	Hungerford (1948)	
						<i>Hesperocorixa</i>	X				X	X	X	X	X	Hungerford (1948)	
						<i>Hesperocorixa atopodonta</i> (Hungerford, 1927)	X					X	X			Hungerford (1948)	
						<i>Hesperocorixa escheri</i> (Heer, 1853)	X						X			Hungerford (1948)	dubius species?
						<i>Hesperocorixa kennicotti</i> (Uhler, 1897)	X						X			Hungerford (1948)	
						<i>Hesperocorixa laevigata</i> (Uhler, 1893)	X				X	X	X	X	X	Hungerford (1948)	
						<i>Hesperocorixa nitida</i> (Fieber, 1851)	X						X			Hungerford (1948)	
						<i>Hesperocorixa vulgaris</i> (Hungerford, 1925)	X				X	X	X			Hungerford (1948)	
						<i>Morphocorixa</i>	X								X	Hungerford (1948)	
						<i>Morphocorixa lundbladi</i> (Jaczewski, 1931)	X								X	Hungerford (1948)	

Taxonomic Hierarchy						Habitat		Distribution					Literature Cited		Comments			
Order	Suborder	Infrarorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
						Palmacorixa		X			?						Hungerford (1948)	unpublished record for CA
						<i>Palmacorixa buenoi</i> Abbott, 1913		X			?						Hungerford (1948)	unpublished record for CA
						Pseudocorixa		X							X		Hungerford (1948)	
						<i>Pseudocorixa beameri</i> (Hungerford, 1928)		X							X		Hungerford (1948)	
						Ramphocorixa		X							X		Hungerford (1948)	
						<i>Ramphocorixa rotundocephala</i> Hungerford, 1927		X							X		Hungerford (1948)	
						Sigara		X			X	X	X	X	X		Hungerford (1948)	
						<i>Sigara decoratella</i> (Hungerford, 1926)		X					X				Hungerford (1948)	
						<i>Sigara alternata</i> (Say, 1825)		X			X	X			X		Hungerford (1948)	
						<i>Sigara grossolineata</i> Hungerford, 1948		X			X	X	X				Hungerford (1948)	
						<i>Sigara krafti</i> Stonedahl, 1984		X				X	X				Stonedahl (1984)	
						<i>Sigara mckinstriyi</i> Hungerford, 1948		X			X	X	X				Hungerford (1948)	
						<i>Sigara nevadensis</i> (Walley, 1936)		X						X			Hungerford (1948)	
						<i>Sigara omani</i> (Hungerford, 1930)		X			X	X	X	X	X		Hungerford (1948)	
						<i>Sigara vallis</i> Lauck, 1966		X			X						Lauck (1979)	
						<i>Sigara vandykei</i> Hungerford, 1948		X			X		X				Hungerford (1948)	
						<i>Sigara washingtonensis</i> Hungerford, 1948		X			X	X	X	X	X		Hungerford (1948)	
						Trichocorixa		X			X	X			X	X	Hungerford (1948)	
						<i>Trichocorixa arizonensis</i> Sailer, 1948		X							X		Hungerford (1948)	
						<i>Trichocorixa calva</i> (Say, 1832)		X			X				X		Hungerford (1948)	
						<i>Trichocorixa reticulata</i> (Guerin-Meneville, 1857)		X			X				X		Hungerford (1948)	
						<i>Trichocorixa uhleri</i> Sailer, 1948		X							X		Hungerford (1948)	

Taxonomic Hierarchy					Habitat		Distribution					Literature Cited		Comments					
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
						<i>Trichocorixa verticalis</i> (Fieber, 1851)		X			X	X				X	Hungerford (1948)		
						Graptocorixini		X			X	X			X	X	X	Hungerford (1948)	
						<i>Graptocorixa</i>		X			X	X			X	X		Hungerford (1948)	
						<i>Graptocorixa abdominalis</i> (Say, 1832)		X							X	X	X	Hungerford (1948)	
						<i>Graptocorixa californica</i> (Hungerford, 1925)		X			X	X						Hungerford (1948)	
						<i>Graptocorixa gerhardi</i> (Hungerford, 1925)		X								X		Hungerford (1948)	
						<i>Graptocorixa serrulata</i> (Uhler, 1897)		X				X			X	X		Hungerford (1948)	
						<i>Graptocorixa uhleri</i> (Hungerford, 1925)		X			X				X			Hungerford (1948)	
						<i>Graptocorixa uhleroidea</i> Hungerford, 1938		X			X							Hungerford (1948)	
						Neocorixa		X								X		Hungerford (1948)	monotypic
						<i>Neocorixa snowi</i> Hungerford, 1925		X							X		Hungerford (1948)	monotypic	
	Naucoridae							X			X	X			X	X			
	Ambrysinae							X			X	X			X	X			
						Ambrysus		X			X	X			X	X		Polhemus (1979); La Rivers (1951)	
						<i>Ambrysus amargosus</i> La Rivers, 1953		X							X			Polhemus (1979); La Rivers (1951)	Ash Meadows, NV
						<i>Ambrysus arizonus</i> La Rivers, 1951		X							X			Polhemus (1979); La Rivers (1951)	
						<i>Ambrysus californicus</i> Montandon, 1897		X			X							Polhemus (1979); La Rivers (1951)	
						<i>Ambrysus circumcinctus</i> Montandon, 1910		X							X			Polhemus (1979); La Rivers (1951)	
						<i>Ambrysus funebris</i> La Rivers, 1949		X			X							Polhemus (1979); La Rivers (1951)	Death Valley, CA
						<i>Ambrysus melanopterus</i> Stal, 1862		X								X		Polhemus (1979); La Rivers (1951)	
						<i>Ambrysus mormon</i> Montandon, 1909		X			X	X			X	X		Polhemus (1979); La Rivers (1951)	

Taxonomic Hierarchy					Species	Habitat			Distribution			NV	AZ	Baja	Literature Cited	Comments		
Order	Suborder	Infraorder	Family	Subfamily		Tribe	Genus	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA				
					<i>Ambrysus occidentalis</i> La Rivers, 1951		X			X					X	Polhemus (1979); La Rivers (1951)		
					<i>Ambrysus pulchellus</i> Montandon, 1897		X								X	Polhemus (1979); La Rivers (1951)		
					<i>Ambrysus puncticollis</i> Stal, 1876		X			X					X	Polhemus (1979); La Rivers (1951)		
					<i>Ambrysus woodburyi</i> Usinger, 1946		X								X X	Polhemus (1979); La Rivers (1951)		
				Limnocorinae				X							X	Polhemus (1979); La Rivers (1951)		
					<i>Limnocoris</i>			X							X	Polhemus (1979); La Rivers (1951)		
					<i>Limnocoris moapensis</i> (La Rivers, 1950)		X								X	Sites and Willig (1994)	Moapa Warm Springs, NV	
				Naucorinae				X			X				X X	Polhemus (1979); La Rivers (1951)		
					<i>Pelocoris</i>			X			X				X X	Polhemus (1979); La Rivers (1951)		
					<i>Pelocoris biimpressus</i> Montandon, 1898		X			X					X X	Polhemus and Sites (1995)	<i>P. shoshone</i> La Rivers, 1948 now a synonym	
				Nepidae				X			X X				X	Sites and Polhemus (1994)		
					Nepinae			X								X	Sites and Polhemus (1994)	
					Nepinae Curictini			X								X	Sites and Polhemus (1994)	
					<i>Curicta</i>			X							X	Sites and Polhemus (1994)		
					<i>Curicta pronotata</i> Kuitert, 1949		X								X	Sites and Polhemus (1994)		
				Ranatrinae				X			X X				X	Sites and Polhemus (1994)		
					<i>Ranatra</i>			X			X X				X	Sites and Polhemus (1994)		
					<i>Ranatra brevicollis</i> Montandon, 1910		X			X						Sites and Polhemus (1994)		
					<i>Ranatra fusca</i> Palisot, 1820		X			X X						Sites and Polhemus (1994)		

Taxonomic Hierarchy							Habitat		Distribution					Literature Cited		Comments			
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
							<i>Ranatra montezuma</i> Polhemus, 1976	X								X		Sites and Polhemus (1994)	known only from Montezuma's Well, AZ
							<i>Ranatra quadridentata</i> Stal, 1862	X			X					X		Sites and Polhemus (1994)	

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## Megaloptera: Dobsonflies and Alderflies

**Standard Effort Level I:** Genus

**Standard Effort Level II:** Genus

**Standard Taxonomic Reference:** Evans and Neunzig (1996)

Larvae may be identified to genus using the key in Merritt and Cummins (Evans and Neunzig, 1996). Early instar corydalids are best left at family since head color patterns generally do not develop until later instars. Evans's (1972) unpublished dissertation provides a species key to western megalopteran larvae, although the key does not include one species of *Sialis* and three species of *Protochauliodes*. Keys to adults as well as distributional and ecological information may found in the sources listed below. The Bibliography of the Neuropterida website is a useful resource and provides many downloadable PDFs of Megaloptera and Neuroptera literature.

Taxonomic Hierarchy				Habitat		Distribution						Literature Cited		Comments	
Order	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
Megaloptera					X	X	X		X	X	X	X	X	X	
	Corydalidae				X	X			X	X	X	X	X	X	Evans and Neunzig (1996)
		<i>Corydalus</i>			X	X			X			X	X	X	Contreras-Ramos (1998)
			<i>Corydalus bidenticulatus</i> Contreras-Ramos, 1998		X	X							X		Contreras-Ramos (1998)
			<i>Corydalus texanus</i> Banks, 1903		X	X			X			X	X	X	Contreras-Ramos (1998)
		<i>Dysmicohermes</i>			X	X			X	X	X				Evans (1972)
		<i>Neohermes</i>			X	X			X	X		X	X		Evans (1972)
		<i>Orohermes</i>			X	X			X	X					Evans (1972)
			<i>Orohermes crepusculus</i> (Chandler, 1954)		X	X			X	X					Evans (1972)
		<i>Protochauliodes</i>			X	X			X	X	X				mostly found in intermittent streams; larvae not described for all species
	Sialidae				X	X	X		X	X	X	X			
		<i>Sialis</i>			X	X	X		X	X	X	X			Evans (1972); Whiting (1991) key to mature larvae, but lacking <i>S. bilobata</i>

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## **Neuroptera: Spongillaflies**

**Standard Effort Level I:** Genus

**Standard Effort Level II:** Genus

**Standard Taxonomic Reference:** Evans and Neunzig (1996)

Larvae may be identified to genus using the key in Merritt and Cummins (Evans and Neunzig, 1996). Although there are no species keys for larvae, there is only one species in each genus found in the region. Larvae feed on and live in conjunction with freshwater sponges. Several other Neuroptera families occur in the region and their larvae occasionally show up in benthic samples. Tauber (1991) provides a key to North American Neuroptera larvae. The Bibliography of the Neuropterida website is a useful resource and provides many downloadable PDFs of Megaloptera and Neuroptera literature.

Taxonomic Hierarchy			Habitat		Distribution						Literature Cited		Comments	
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
		Neuroptera		X	X	X		X	X					Evans and Neunzig (1996); Parfin and Gurney (1956); Brown (1974)
		Sisyridae		X	X	X		X	X					Evans and Neunzig (1996); Parfin and Gurney (1956); Brown (1974)
			Climacia	X		X		X	X					Chandler (1953); Whaley et al. (2004)
			<i>Climacia californica</i> Chandler, 1953	X		X		X	X					Chandler (1953); Whaley et al. (2004)
			Sisyra	X		X			X					Grigarick (1975)
			<i>Sisyra vicaria</i> Walker, 1853	X		X			X					Grigarick (1975)
														only species in the region
														only species in the region
														only one species in the region

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### **Additional Sources of Information on Neuroptera**

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**Trichoptera: Caddisflies****Standard Effort Level I:** Genus**Standard Effort Level II:** Species (where possible)**Standard Taxonomic Reference:** Wiggins (1996a)

Keys to families and genera are given in Wiggins (1996a) as well as the chapters in Merritt and Cummins (Wiggins, 1996b; Morse and Holzenthal, 1996). Wiggins (2004) provides updated family keys for larvae, pupae and adults as well as providing a wealth of behavioral and ecological information. Distributional information comes from original sources. The Trichoptera World Checklist website maintained by John C. Morse at Clemson University is a good source for information.

Larvae for many genera are not identifiable to species because some remain undescribed. Larvae and pupae can sometimes be reared to adults and thus identified to species, but only if living specimens are collected. For preserved specimens, well-developed, pharate pupae can sometimes be identified to species by using the metamorphotype method (Milne, 1938). In this case, the genitalia of a pharate pupa can be observed through the pupal cuticle and the specimen identified using keys and descriptions of the adult.

There are presently 19 recognized species groups of *Rhyacophila* known from the region covered by this list. Of these, 14 species groups have at least one representative species described as larvae in the peer-reviewed literature. These citations can be found in the list under the literature cited column for each species group. Ross (1956) and Schmid (1970) assigned most of the known *Rhyacophila* species to species groups based on adult characteristics. Three as yet unpublished but disseminated works (Wold, 1973; Smith, draft key and Wisseman, draft key) have further dealt with *Rhyacophila*, illustrating or describing larvae for most of the species groups. Associative material now exists for 4 of the remaining 5 species groups, leaving only larvae from the *Rhyacophila viquaea* group as undescribed and unassociated. Since the metamorphotype method may be used to identify pupae to any of these species groups based on the adult morphology and taxonomy, all 19 species groups names have been included in this version of the STE List (see STE Rules, section 3.2.3). However, at this time we recommend not using the following species group names for larval identifications until formal descriptions appear in the peer reviewed literature: *ecosa* group, *rayneri* group, *vemna* group, *viquaea* group and *vofixa* group.

Taxonomic Hierarchy			Habitat		Distribution					Literature Cited		Comments				
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
Trichoptera					X	X	X			X	X	X	X	X	X	Wiggins (1996)
	Spicipalpia															
		Glossosomatidae			X	X				X	X	X	X	X		Wiggins (1996)
			Agapetus		X	X				X	X	X		X		Wiggins (1996)
			Anagapetus		X	X				X	X	X				Wiggins (1996); Ruitter (2004)
			Culoptila		X	X								X		Wiggins (1996); Blahnik and Holzenthal (2006)
			Glossosoma		X	X				X	X	X	X	X		Wiggins (1996)
			Protoptila		X	X				X	X	X		X		Wiggins (1996)
		Hydrobiosidae			X	X							X			Wiggins (1996)
			Atopsyche		X	X							X	X		Wiggins (1996)
		Hydroptilidae			X	X	X			X	X	X	X	X		Wiggins (1996); Bickle (1979)
			Agrylea		X	X	X			X	X	X				Primarily lotic, will sometimes be found in slow-moving sections of streams
			Alisotrichia		X	X							X			Wiggins (1996)
				Alisotrichia arizonica (Bickle & Denning, 1977)	X	X							X			
			Dibusa		X	X			?							Based on an undescribed species collected by D.G. Denning; larvae probably similar to the eastern species <i>D. angata</i> Ross
			Hydroptila		X	X	X			X	X	X	X	X		Wiggins (1996)
			Ithytrichia		X	X				X				X		Wiggins (1996)
			Leucrotrichia		X	X				X	X		X	X		Wiggins (1996)
			Mayatrictchia		X	X							X			Wiggins (1996)
				Mayatrictchia ayama Mosely, 1937	X	X							X			
			Metricchia		X	X						X				found in small springs and seeps
			Neotrichia		X	X			X			X		X		Wiggins (1996)
			Nothotrichia		X	X			X							larval association made with a metamorphotype male; the description is in progress
				Nothotrichia shasta Harris and Armitage, 1997	X	X			X							larval association made with a metamorphotype male; the description is in progress
			Ochrotrichia		X	X			X	X	X	X	X	X		many undescribed species in CA alone

Taxonomic Hierarchy				Habitat		Distribution					Literature Cited		Comments				
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
					<i>Oxyethira</i>	X	X	X		X	X	X		X		Wiggins (1996)	
					<i>Palaeagapetus</i>	X	X			X	X	X				Wiggins (1996)	occur in cold water seeps in liverworts
					<i>Stactobiella</i>	X	X			X	X	X		X		Wiggins (1996)	occur in small, rapid streams
					<i>Zumatrichia</i>	X	X							X		Wiggins (1996)	occur in fast-flowing, large rivers
					<i>Zumatrichia notosa</i> (Ross, 1944)	X	X							X			
					<i>Rhyacophilidae</i>	X	X			X	X	X				Wiggins (1996)	
					<i>Himalopsyche</i>	X	X			X	X	X				Wiggins (1996)	only one species in Nearcti
					<i>Himalopsyche phryganea</i> (Ross, 1941)	X	X			X	X	X					only one species in Nearcti
					<i>Rhyacophila</i>	X	X			X	X	X	X	X		Wiggins (1996)	
					<i>Rhyacophila alberta</i> group sensu Schmid (1970)	X	X			X	X	X				Schmid (1970), Smith (1968)	
					<i>Rhyacophila angelita</i> group sensu Schmid (1970)	X	X			X	X	X		X		Schmid (1970), Flint (1962), Smith (1968)	
					<i>Rhyacophila betteni</i> group sensu Schmid (1970)	X	X			X	X	X				Schmid (1970), Smith (1968)	
					<i>Rhyacophila brunnea</i> group sensu Smith and Manuel (1984)	X	X			X	X	X	X			Smith and Manuel (1984)	
					<i>Rhyacophila coloradensis</i> group sensu Schmid (1970)	X	X			X	X	X				Schmid (1970), Smith (1968), Peck and Smith (1977)	
					<i>Rhyacophila ecosa</i> group sensu Schmid (1970)	X	X			X	X	X				Schmid (1970)	
					<i>Rhyacophila grandis</i> group sensu Schmid (1970)	X	X			X	X	X				Schmid (1970), Smith (1984)	
					<i>Rhyacophila hyalinata</i> group sensu Schmid (1970)	X	X			X	X					Schmid (1970), Smith (1968)	
					<i>Rhyacophila lieftincki</i> group sensu Schmid (1970)	X	X			X	X	X				Schmid (1970), Smith (1984)	
					<i>Rhyacophila arnaudi</i> Denning, 1948	X	X			X	X	X					sole representative of lieftincki group
					<i>Rhyacophila nevadensis</i> group sensu Schmid (1970)	X	X			X	X	X	X			Schmid (1970), Smith (1985)	
					<i>Rhyacophila oreta</i> group sensu Schmid (1970)	X	X			X	X	X				Schmid (1970), Smith (1968)	
					<i>Rhyacophila rayneri</i> group sensu	X	X			X				X		Ross (1956)	larvae associated, but unpublished

Taxonomic Hierarchy				Habitat		Distribution					Literature Cited		Comments				
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
					Ross (1956)												
					<i>Rhyacophila rayneri</i> Ross, 1951	X	X		X						X		
					<i>Rhyacophila rotunda</i> group sensu Schmid (1970)	X	X		X			X	X			Schmid (1970), Smith (1968)	
					<i>Rhyacophila sibirica</i> group sensu Ross (1956)	X	X		X	X	X					Schmid (1970), Smith (1968)	
					<i>Rhyacophila vagrita</i> group sensu Schmid (1970)	X	X			X	X					Schmid (1970), Smith (1968)	
					<i>Rhyacophila vagrita</i> Milne, 1936	X	X			X	X						
					<i>Rhyacophila vemna</i> group sensu Schmid (1970)	X	X			X	X					Schmid (1970)	larvae unknown, most likely similar to brunnea group but bigger
					<i>Rhyacophila verrula</i> group sensu Schmid (1970)	X	X		X	X	X					Schmid (1970), Smith (1968)	
					<i>Rhyacophila viquaea</i> group sensu Schmid (1970)	X	X		X	X	X					Schmid (1970)	larva unknown
					<i>Rhyacophila vofixa</i> group sensu Schmid (1970)	X	X		X	X	X					Schmid (1970)	larvae associated, but unpublished
	Annulipalpia																
		Hydropsychidae				X	X			X	X	X	X	X		Wiggins (1996)	
		Arctopsyche				X	X			X	X	X	X			Wiggins (1996); Givens and Smith (1980)	Occur in cold, fast streams; key to larvae in Givens and Smith (1980)
					<i>Arctopsyche californica</i> Ling, 1938	X	X		X							Givens and Smith (1980)	
					<i>Arctopsyche grandis</i> (Banks, 1900)	X	X		X	X	X	X				Givens and Smith (1980)	
		Cheumatopsyche				X	X			X	X	X	X	X		Wiggins (1996)	Occur in warmer streams; relatively tolerant of pollution; larvae not presently identifiable to species
		Diplectrona				X	X			X							CA endemic; known from only a couple sites in Southern CA
					<i>Diplectrona californica</i> Banks, 1914	X	X		X							CA endemic; known from only a couple sites in Southern CA	
		Homoplectra				X	X			X	X					Wiggins (1996)	Occur in intermittent spring seeps, headwaters of mountain streams
		Hydropsyche				X	X			X	X	X	X	X		Wiggins (1996); Scheftner and Wiggins (1984)	Some authors split this genus into Hydropsyche (s. str.) and Ceratopsyche (Scheftner and Wiggins 1984)

Taxonomic Hierarchy			Habitat				Distribution					Literature Cited		Comments		
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
																use the term <i>Hydropsyche morosa</i> group)
			<i>Parapsyche</i>		X	X			X	X	X	X				Occur in small, cold streams; only two of the five known western species described as larvae
			<i>Smicridea</i>		X	X			X				X			Often abundant in southwestern streams
			<i>Philopotamidae</i>		X	X			X	X		X	X			Wiggins (1996)
			<i>Chimarra</i>		X	X			X	X		X	X			Wiggins (1996)
			<i>Dolophilodes</i>		X	X			X	X	X	X				Wiggins (1996)
			<i>Wormaldia</i>		X	X			X	X	X	X	X			Wiggins (1996)
			<i>Polycentropodidae</i>		X	X	X		X	X	X			X		Wiggins (1996)
			<i>Paranyctiophylax</i>		X	X	X			X						Wiggins (1996)
			<i>Paranyctiophylax moestus</i> (Banks, 1911)		X	X	X			X						Occur in lakes and slow-moving sections of streams
			<i>Polycentropus</i>		X	X	X		X	X	X		X			Wiggins (1996); Wiggins (1973)
			<i>Polyplectropus</i>		X	X							?			Wiggins (1996)
			<i>Polyplectropus charlesi</i> (Ross, 1941)		X	X							?			unpublished record from AZ
			<i>Psychomyiidae</i>		X	X			X	X	X		X			Wiggins (1996)
			<i>Psychomyia</i>		X	X			X	X	X		X			Wiggins (1996)
			<i>Tinodes</i>		X	X			X	X		X	X			Wiggins (1996)
			<i>Xiphocentronidae</i>		X	X							X			Wiggins (1996)
			<i>Cniodocentron</i>		X	X							X			Wiggins (1996); Moulton and Stewart (1997)
			<i>Cniodocentron yavapai</i> Moulton and Stewart, 1997		X	X							X			Wiggins (1996); Moulton and Stewart (1997)
			<i>Integrapalpia</i>		X	X	X		X	X	X	X	X	X		
			<i>Apataniidae</i>		X	X	X		X	X	X	X	X			Wiggins (1996)
			<i>Allomyia</i>		X	X			X	X	X	X				cold springs, Sierra Nevada Mts.
			<i>Apatania</i>		X	X	X									larvae in far North or at high elevations may live in lakes; only 1 of the 4 species described as larvae
			<i>Moselyana</i>													
			<i>Moselyana comosa</i> (Denning,		X	X			X	X						monotypic; larvae live in seeps

Taxonomic Hierarchy				Habitat		Distribution					Literature Cited		Comments			
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
				1949)												
				<i>Pedomoecus</i>												
				<i>Pedomoecus sierra</i> Ross, 1947	X	X			X	X	X				Wiggins (1996)	monotypic
				Brachycentridae	X	X			X	X	X	X	X			
				<i>Amiocentrus</i>												
				<i>Amiocentrus aspilus</i> (Ross, 1938)	X	X			X	X		X			Wiggins (1996)	monotypic
				<i>Brachycentrus</i>	X	X			X	X	X	X	X		Wiggins (1996); Flint (1984)	larvae are identifiable to species
				<i>Brachycentrus americanus</i> (Banks, 1899)	X	X			X	X	X		X		Flint (1984)	
				<i>Brachycentrus echo</i> (Ross, 1947)	X	X			X						Flint (1984)	
				<i>Brachycentrus occidentalis</i> Banks, 1911	X	X			X	X	X	X	X		Flint (1984)	
				<i>Eobrachycentrus</i>												
				<i>Eobrachycentrus gelidae</i> Wiggins, 1965	X	X			X	X					Wiggins (1996)	monotypic
				<i>Micrasema</i>	X	X			X	X	X		X		Wiggins (1996); Chapin (1978)	
				Calamoceratidae	X	X			X	X					Wiggins (1996)	
				<i>Heteroplectron</i>												
				<i>Heteroplectron californicum</i> MacLachlan, 1871	X	X			X	X					Wiggins (1996)	larvae live in slower moving waters with woody debris
				<i>Phylloicus</i>	X	X							X		Wiggins (1996)	
				<i>Phylloicus aeneus</i> (Hagen, 1861)	X	X							X		Wiggins (1996)	
				Goeridae	X	X			X	X	X				Wiggins (1996)	
				<i>Goera</i>												
				<i>Goera archaon</i> Ross, 1947	X	X			X	X						one species in Western North America
				<i>Goeracea</i>	X	X				X	X				Wiggins (1996); Wiggins (1973)	key to larvae and pupae of both species
				<i>Goeracea genota</i> (Ross, 1941)	X	X			X	X					Wiggins (1996)	
				<i>Goeracea oregona</i> Denning, 1968	X	X			X	X					Wiggins (1996)	
				<i>Lepania</i>												
				<i>Lepania cascada</i> Ross, 1941	X	X			X	X					Wiggins (1996)	monotypic

Taxonomic Hierarchy				Habitat				Distribution				Literature Cited		Comments		
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
		Helicopsychidae			X X X				X X X			X		X		Wiggins (1996); Johanson (2002)
		<i>Helicopsyche</i>			X X X				X X X			X		X		Wiggins (1996); Johanson (2002) larvae not adequately separable to species
		Lepidostomatidae			X X X											Wiggins (1996); Weaver (1988)
		<i>Lepidostoma</i>			X X X				X X X X X							Wiggins (1996); Weaver (1988)
		Leptoceridae			X X X				X X X X X							Wiggins (1996)
		<i>Ceraclea</i>			X X X				X X X X X							Wiggins (1996); Resh (1976); Morse (1975) some species feed on freshwater sponges
		<i>Mystacides</i>			X X X				X X X							Wiggins (1996)
		<i>Nectopsyche</i>			X X X				X X X X X							Wiggins (1996) larvae of Western species are incompletely separable
		<i>Oecetis</i>			X X X				X X			X				Wiggins (1996); Floyd (1995)
		<i>Triaenodes</i>			X X X					X X			X			Holzenthal and Andersen (2004) consider <i>Ylodes</i> as a subgenus of <i>Triaenodes</i>
		<i>Ylodes</i>			X X X				X X			X				Holzenthal and Andersen (2004) consider <i>Ylodes</i> as a subgenus of <i>Triaenodes</i>
		Limnephilidae			X X				X X X X X							monotypic
		<i>Allocosmoecus</i>														
		<i>Allocosmoecus partitus</i> Banks, 1943			X X				X X X							monotypic
		<i>Amphicosmoecus</i>														
		<i>Amphicosmoecus canax</i> (Ross, 1947)			X X				X X							monotypic
		<i>Asynarchus</i>			X X X				X X X							Wiggins (1996)
		<i>Chyrranda</i>														
		<i>Chyrranda centralis</i> (Banks, 1900)			X X				X X X							monotypic
		<i>Clistoronia</i>			X X				X X X			X				Larvae live in ponds and lakes at higher elevations
		<i>Clostoeeca</i>														
		<i>Clostoeeca disjuncta</i> (Banks, 1914)			X X				X X X							monotypic; larvae live in small seepage areas
		<i>Cryptochia</i>			X X				X							Wiggins (1996); Wissman and Anderson (1987) Larvae live in small, cold spring streams at or above water's edge
		<i>Desmona</i>			X X X				X X X							Wiggins (1996); Wiggins and Larvae live in small streams and seepage areas



Taxonomic Hierarchy				Habitat		Distribution					Literature Cited		Comments				
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
					<i>Limnephilus</i>	X	X	X		X	X	X		X		Wiggins (1996)	
					<i>Nemotaulus</i>												
					<i>Nemotaulus hostilis</i> (Hagen, 1873)	X		X			X						only one Nearctic species
					<i>Onocosmoecus</i>	X	X	X		X	X	X	X			Wiggins (1996)	
					<i>Philarctus</i>												
					<i>Philarctus quaeris</i> (Milne, 1935)	X	X	X			X						only one North American species
					<i>Philocasca</i>	X	X					X				Wiggins (1996)	
					<i>Pseudostenophylax</i>												
					<i>Pseudostenophylax edwardsi</i> (Banks, 1920)	X	X			X	X						only one species in western North America
					<i>Psychoglypha</i>	X	X			X	X	X				Wiggins (1996)	larvae may be confused with <i>Homophylax</i>
					<i>Pycnopsyche</i>												
					<i>Pycnopsyche guttifer</i> (Walker, 1852)	X	X				X						only one species in western North America
					<i>Odontoceridae</i>	X	X			X				X		Wiggins (1996)	
					<i>Marilia</i>	X	X			X				X		Wiggins (1996)	
					<i>Namamyia</i>												
					<i>Namamyia plutonis</i> Banks, 1905	X	X			X	X						monotypic
					<i>Nerophilus</i>												
					<i>Nerophilus californicus</i> (Hagen, 1861)	X	X			X	X						monotypic
					<i>Parthina</i>	X	X			X	X			X		Wiggins (1996)	
					<i>Phryganeidae</i>	X	X	X		X	X	X				Wiggins (1996); Wiggins (1998)	Wiggins (1998) reviews larvae and adults for the family
					<i>Agrypnia</i>	X	X	X		X	X	X				Wiggins (1996)	
					<i>Banksiola</i>	X	X	X		X	X					Wiggins (1996)	
					<i>Banksiola crotchi</i> Banks, 1943	X	X	X		X	X					transcontinental; but only species known in western North America	
					<i>Phryganea</i>	X		X		X	X				Wiggins (1996)		
					<i>Phryganea cinerea</i> Walker, 1852	X		X		X	X				Wiggins (1996)		
					<i>Ptilostomis</i>	X	X	X				X			Wiggins (1996)		
					<i>Ptilostomis ocellifera</i> (Walker,	X	X	X			X						

Taxonomic Hierarchy				Habitat		Distribution					Literature Cited		Comments			
Order	Suborder	Family	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
				1852)												
				<i>Yphria</i>												
				<i>Yphria californica</i> (Banks, 1907)	X	X			X	X						monotypic
				Rossianidae	X	X					X					small, cold mountain streams
				<i>Rossiana</i>	X	X					X					small, cold mountain streams
				<i>Rossiana montana</i> Denning, 1953	X	X					X					small, cold mountain streams
				Sericostomatidae	X	X			X	X				X		Wiggins (1996)
				<i>Gumaga</i>	X	X			X	X				X		Wiggins (1996)
				Uenoidae	X	X			X	X	X	X	X			Wiggins (2005)
				<i>Farula</i>	X	X			X	X						Wiggins (2005)
				<i>Neophylax</i>	X	X			X	X	X	X				Vineyard et al. (2005); Wiggins (2004)
				<i>Neophylax occidentalis</i> Banks, 1924	X	X			X	X		X				
				<i>Neophylax rickeri</i> Milne, 1935	X	X			X	X	X					
				<i>Neophylax smithi</i> Vineyard and Wiggins, 1987	X	X					X					
				<i>Neophylax splendens</i> Denning, 1948	X	X			X	X	X					
				<i>Neothremma</i>	X	X										Wiggins (2004)
				<i>Oligophlebodes</i>	X	X			X	X	X		X			small, turbulent mountain streams
																small, turbulent mountain streams

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## Lepidoptera: Moths and Butterflies

**Standard Effort Level I:** Genus for *Parapoynx* and *Petrophila*, otherwise Order

**Standard Effort Level II:** Genus for *Parapoynx* and *Petrophila*, otherwise Order

**Standard Taxonomic Reference:** Lange (1996)

Larvae of *Parapoynx* and *Petrophila* may be identified to genus using the key in Merritt and Cummins (Lange, 1996). This key and others for aquatic Lepidoptera should be used with caution for specimens collected in bioassessment samples. Careful collecting of Lepidoptera larvae to preserve case integrity and to record host-plant association is required to eliminate accidentals (e.g., terrestrial or riparian taxa). The key presented in Stehr and Martinat (1987) is a more complete guide to the families of North American Lepidoptera.

Taxonomic Hierarchy				Habitat			Distribution					Literature Cited			Comments
Order	Family	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
Lepidoptera				X	X	X		X	X	X	X	X	X	Lange (1996); Stehr and Martinat (1987)	
	Pyralidae			X	X	X		X	X	X	X	X	X		
		<i>Parapoynx</i>		X	X			X							
		<i>Petrophila</i>		X	X	X		X	X	X	X	X	X		

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## Coleoptera: Beetles

**Standard Effort Level I:** Genus

**Standard Effort Level II:** Species (where possible)

**Standard Taxonomic Reference:** White and Brigham (1996)

Aquatic beetles (larvae and adults) can generally be identified to genus using the keys in Merritt and Cummins (White and Brigham, 1996). Adults can be identified to genus using the keys in Arnett and Thomas (2001) and Arnett et al. (2002). Although designed for the Florida beetle fauna, Epler (1999) is a useful resource. Larson et al. (2000) should be used for all generic dytiscid identifications. For specimens from the Southwest, other supplementary references may be required for species identifications. Post (2005) put together an excellent guide to California dytiscids. Challet and Brett (1998) is very useful for dytiscid distributions within California. An undescribed elmid genus, which is being described by Cheryl Barr, is known to occur throughout the Pacific Northwest. Shepard (1993) gives some habitat and ecological information for this genus. Brown (1972) is still the best source for elmid species keys. The keys in White and Brigham (1996) for the Chrysomelidae, Staphylinidae and Curculionidae should be used with caution since each of these families have very few truly aquatic representatives – none benthic – but many terrestrial genera. The inclusion of these genera in White and Brigham (1996) for these families makes the assumption that the specimens being keyed are definitely aquatic, thus excluding the possibility of accidental terrestrials. This caveat also applies to a number of other families that have riparian or strictly terrestrial adults.

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution				Literature Cited	Comments	
							Benthic	Lotic		CA	OR	WA	NV	AZ		
Coleoptera							X	X	X	X	X	X	X	X	White and Brigham (1996)	Keys for families and genera
	Myxophaga															
		Hydroscaphidae					X					X	X			found in thin films of water
			Hydroscapha				X					X	X			found in thin films of water
						<i>Hydroscapha natans</i> LeConte, 1874	X			X		X	X			found in thin films of water
Adephaga																
		Amphizoidae					X	X		X	X	X			Kavanaugh (1986)	
			Amphizoa				X	X		X	X	X			Kavanaugh (1986)	
						<i>Amphizoa insolens</i> LeConte, 1853	X	X		X	X	X			Kavanaugh (1986)	
		Carabidae								X	X	X	X	X		Many species are riparian; only two listed as "semi-aquatic"

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	Literature Cited	Comments
						Omophronini												
						<i>Omophron</i>				X								shoredwellers
						<i>Thalassotrechus</i>				X								
						<i>Thalassotrechus barbareae</i> (Horn, 1892)				X								intertidal dweller
						<i>Thalassotrechus nigripennis</i> van Dyke, 1918				X								intertidal dweller
						Dytiscidae	X	X	X		X	X	X	X	X	X	Larson et al. (2000); Post (2005); Challet and Brett (1998)	The keys in Merritt and Cummins are outdated and contain numerous errors; Larson et al. (2000) should be considered as the standard text for this family.
						Copelatinae	X		X		X	X				X	Larson et al. (2000)	
						<i>Copelatus</i>	X		X		X	X				X	Larson et al. (2000)	
						<i>Copelatus chevrolati renovatus</i> Guignot, 1952	X		X		X					X	Larson et al. (2000)	
						<i>Copelatus glyphicus</i> (Say, 1823)	X		X		X	X					Larson et al. (2000)	
						Hydrotrupinae	X	X			X	X					Larson et al. (2000)	monotypic; Pacific Coast of CA and OR; also Sierra Nevada Mts.
						<i>Hydrotrupes</i>	X	X			X	X					Larson et al. (2000)	monotypic; Pacific Coast of CA and OR; also Sierra Nevada Mts.
						<i>Hydrotrupes palpalis</i> Sharp, 1882	X	X			X	X					Larson et al. (2000)	monotypic; Pacific Coast of CA and OR; also Sierra Nevada Mts.
						Laccophilinae			X		X	X	X	X	X		Larson et al. (2000); Zimmerman (1970)	
						<i>Laccophilus</i>	X		X		X	X	X	X	X		Larson et al. (2000); Zimmerman (1970)	
						<i>Laccophilus biguttatus</i> Kirby, 1837	X		X		X						Larson et al. (2000); Zimmerman (1970)	
						<i>Laccophilus fasciatus terminalis</i> Sharp, 1882	X		X		X						Larson et al. (2000); Zimmerman (1970)	
						<i>Laccophilus maculosus decipiens</i> LeConte, 1852	X		X		X	X	X	X			Larson et al. (2000); Zimmerman (1970)	
						<i>Laccophilus maculosus shermani</i> Leech, 1944	X								X		Larson et al. (2000); Zimmerman (1970)	
						<i>Laccophilus mexicanus atristernalis</i> Crotch, 1873	X				X						Larson et al. (2000); Zimmerman (1970)	
						<i>Laccophilus mexicanus mexicanus</i>	X				X						Larson et al. (2000);	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Baja	Literature Cited	Comments
							Benthic	Lotic		CA	OR	WA	NV	AZ			
						Aube, 1838										Zimmerman (1970)	
						<i>Laccophilus quadrilineatus</i> <i>quadrilineatus</i> Horn, 1871	X		X							Larson et al. (2000); Zimmerman (1970)	
						<i>Laccophilus sonorensis</i> Zimmerman, 1970	X		X							Larson et al. (2000); Zimmerman (1970)	
						Hydroporinae	X		X	X	X	X	X	X	Larson et al. (2000)		
						<i>Laccornini</i>	X	X		X	X					Larson et al. (2000)	
						<i>Laccornis</i>	X	X		X	X					Larson et al. (2000)	
						<i>Laccornis pacificus</i> Leech, 1940	X	X		X	X					Larson et al. (2000)	
						Methlini	X		X							Larson et al. (2000)	
						<i>Celina</i>	X		X							Larson et al. (2000)	
						<i>Celina occidentalis</i> Young, 1979	X		X							Larson et al. (2000)	
						Hydrovatini	X		X							Larson et al. (2000)	
						<i>Hydrovatus</i>	X		X							Larson et al. (2000)	
						<i>Hydrovatus brevipes</i> Sharp, 1882	X		X							Larson et al. (2000)	
						<i>Hydrovatus davidis</i> Young, 1956	X		X							Larson et al. (2000)	
						Hyphydrini	X		X	X	X	X	X			Larson et al. (2000)	
						<i>Desmopachria</i>	X									Larson et al. (2000)	
						<i>Desmopachria convexa</i> (Aube, 1838)	X	X		X						Larson et al. (2000)	
						<i>Desmopachria dispersa</i> (Crotch, 1873)	X		X							Larson et al. (2000)	
						<i>Desmopachria latissima</i> (LeConte, 1851)	X		X							Larson et al. (2000)	
						<i>Desmopachria mexicana</i> Sharp, 1882	X		X			X				Larson et al. (2000)	
						<i>Desmopachria portmanni</i> (Clark, 1862)	X						X			Larson et al. (2000)	
						Bidessini	X	X	X	X	X	X	X	X	Larson et al. (2000)		
						<i>Liodessus</i>	X	X	X	X	X	X	X	X	Larson et al. (2000)		
						<i>Liodessus obscurellus</i> (LeConte, 1852)	X	X	X	X	X	X	X	X	Larson et al. (2000)	widespread in the West	
						<i>Liodessus saratogae</i> Miller, 1998	X		X						Larson et al. (2000)	Death Valley, CA	
						<i>Neoclypeodytes</i>	X		X		X		X	X	Miller (2001); Larson et al. (2000)		
						<i>Neoclypeodytes cinctellus</i> (LeConte, 1852)	X	X		X		X	X	X	Miller (2001); Larson et al. (2000)		

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Baja	Literature Cited	Comments
							Benthic	Lotic		CA	OR	WA	NV	AZ			
						<i>Neoclypeodytes leachi</i> (Leech, 1948)	X			X	X					Miller (2001); Larson et al. (2000)	
						<i>Neoclypeodytes ornatellus</i> (Fall, 1917)	X	X		X	X					Miller (2001); Larson et al. (2000)	
						<i>Neoclypeodytes pictodes</i> (Sharp, 1882)	X			X						Miller (2001); Larson et al. (2000)	
						<i>Neoclypeodytes plicipennis</i> (Crotch, 1873)	X			X				X		Miller (2001); Larson et al. (2000)	
						<i>Neoclypeodytes quadripustulatus</i> (Fall, 1917)	X			X						Miller (2001); Larson et al. (2000)	
						<i>Neoclypeodytes roughleyi</i> Miller, 2001	X			X						Miller (2001); Larson et al. (2000)	
		<i>Uvarus</i>					X	X		X	X			X	X	Larson et al. (2000)	
		<i>Uvarus subtilis</i> (LeConte, 1852)					X	X		X	X			X	X	Larson et al. (2000)	
		Hydroporini					X	X	X		X	X	X	X	X	Larson et al. (2000)	
		<i>Hydroporus</i>					X	X	X		X	X	X	X	X	Larson et al. (2000)	
		<i>Hydroporus axillaris</i> LeConte, 1851					X	X		X	X	X				Larson et al. (2000)	
		<i>Hydroporus carri</i> Larson, 1975					X	X			X					Larson et al. (2000)	
		<i>Hydroporus despectus</i> Sharp, 1882					X		X		X		X			Larson et al. (2000)	
		<i>Hydroporus fortis</i> LeConte, 1851					X		X		X	X	X			Larson et al. (2000)	
		<i>Hydroporus fuscipennis</i> Schaum, 1868					X		X				X			Larson et al. (2000)	
		<i>Hydroporus hirsutus</i> Gordon, 1981					X				X					Larson et al. (2000)	Mt. Goethe, Fresno Co.
		<i>Hydroporus hirtellus</i> LeConte, 1852					X		X		X	X	X	X		Larson et al. (2000)	
		<i>Hydroporus leechi</i> Gordon, 1981					X		X							Larson et al. (2000)	
		<i>Hydroporus klamathensis</i> Larson and Roughley, 2000					X				X	X				Larson et al. (2000)	
		<i>Hydroporus longiusculus</i> Gemminger & Harold, 1868					X				X	X	X			Larson et al. (2000)	
		<i>Hydroporus mannerheimi</i> Balfour-Browne, 1944					X		X		X	X	X			Larson et al. (2000)	
		<i>Hydroporus notabilis</i> LeConte, 1850					X				X					Larson et al. (2000)	
		<i>Hydroporus occidentalis</i> Sharp, 1882					X		X			X				Larson et al. (2000)	
		<i>Hydroporus pervicinus</i> Fall, 1923					X		X		X	X	X	X		Larson et al. (2000)	
		<i>Hydroporus signatus</i> Mannerheim, 1853					X						X			Larson et al. (2000)	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Baja	Literature Cited	Comments
							Benthic	Lotic		CA	OR	WA	NV	AZ			
						<i>Hydroporus similis</i> Fall, 1923	X			X	X	X				Larson et al. (2000)	
						<i>Hydroporus simplex</i> Gordon, 1981	X	X		X						Larson et al. (2000)	
						<i>Hydroporus sinuatipes</i> Fall, 1923	X	X		X	X	X				Larson et al. (2000)	
						<i>Hydroporus striola</i> (Gyllenhal, 1827)	X					X				Larson et al. (2000)	
						<i>Hydroporus subpubescens</i> LeConte, 1852	X	X		X	X	X				Larson et al. (2000)	
						<i>Hydroporus tademus</i> Leech, 1949	X	X		X	X	X				Larson et al. (2000)	
						<i>Hydroporus tenebrosus</i> LeConte, 1850	X	X				X	X			Larson et al. (2000)	
						<i>Hydroporus transpunctatus</i> Chandler, 1941	X	X		X		X		X		Larson et al. (2000)	
						<i>Hydroporus tristis</i> (Paykull, 1798)	X	X			X	X				Larson et al. (2000)	
						<i>Hydroporus utahensis</i> Gordon, 1981	X			X						Larson et al. (2000)	3300-3700 ft Inyo Co.
						<i>Hydroporus zackii</i> Larson and Roughley, 2000	X	X					X			Larson et al. (2000)	springs in Ash Meadows, Nye Co.
						<i>Hygrotus</i>	X	X		X	X	X	X	X		Larson et al. (2000)	
						<i>Hygrotus artus</i> Fall, 1919	X			X						Larson et al. (2000)	
						<i>Hygrotus bruesi</i> (Fall, 1928)	X				X		X			Larson et al. (2000)	
						<i>Hygrotus collatus</i> (Fall, 1919)	X			X						Larson et al. (2000)	
						<i>Hygrotus curvipes</i> (Leech, 1938)	X			X						Larson et al. (2000)	
						<i>Hygrotus dissimilis</i> Gemminger and Harold, 1868	X	X			X					Larson et al. (2000)	
						<i>Hygrotus fontinalis</i> Leech, 1966	X			X						Larson et al. (2000)	
						<i>Hygrotus fraternus</i> (LeConte, 1852)	X			X						Larson et al. (2000)	
						<i>Hygrotus hydropicus</i> (LeConte, 1852)	X			X						Larson et al. (2000)	
						<i>Hygrotus impressopunctatus</i> (Schaller, 1783)	X	X		X	X	X	X	X		Larson et al. (2000)	
						<i>Hygrotus infuscatus</i> (Sharp, 1882)	X	X		X	X	X	X	X		Larson et al. (2000)	
						<i>Hygrotus intermedius</i> (Fall, 1919)	X	X		X	X	X				Larson et al. (2000)	
						<i>Hygrotus lutescens</i> (LeConte, 1852)	X	X		X	X	X	X	X		Larson et al. (2000)	
						<i>Hygrotus marklini</i> (Gyllenhal, 1813)	X	X						X		Larson et al. (2000)	
						<i>Hygrotus masculinus</i> (Crotch, 1874)	X	X		X	X	X	X			Larson et al. (2000)	
						<i>Hygrotus nigrescens</i> (Fall, 1919)	X	X		X	X	X	X			Larson et al. (2000)	
						<i>Hygrotus nubilis</i> (LeConte, 1855)	X	X						X		Larson et al. (2000)	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Literature Cited	Comments
							Benthic	Lotic		CA	OR	WA	NV	AZ		
						<i>Hygrotus obscureplagiatus</i> (Fall, 1919)	X	X		X	X	X			Larson et al. (2000)	
						<i>Hygrotus patruelis</i> (LeConte, 1855)	X	X		X			X		Larson et al. (2000)	
						<i>Hygrotus pedalis</i> (Fall, 1901)	X			X					Larson et al. (2000)	
						<i>Hygrotus picatus</i> (Kirby, 1837)	X	X				X			Larson et al. (2000)	
						<i>Hygrotus sayi</i> Balfour-Browne, 1944	X	X		X	X	X	X		Larson et al. (2000)	
						<i>Hygrotus semivittatus</i> (Fall, 1919)	X	X		X	X	X	X		Larson et al. (2000)	
						<i>Hygrotus sharpi</i> (van den Branden, 1885)	X			X					Larson et al. (2000)	
						<i>Hygrotus thermarum</i> (Darlington, 1928)	X			X					Larson et al. (2000)	
						<i>Hygrotus tumidiventris</i> (Fall, 1919)	X	X		X	X	X	X	X	Larson et al. (2000)	
						<i>Hygrotus turbidus</i> (LeConte, 1855)	X	X		X	X	X			Larson et al. (2000)	
						<i>Hygrotus unguicularis</i> (Crotch, 1874)	X	X		X	X	X			Larson et al. (2000)	
						<i>Nebrioporus</i>	X	X				X			Larson et al. (2000)	
						<i>Nebrioporus macronychus</i> (Shirt and Angus, 1992)	X	X				X			Larson et al. (2000)	
						<i>Neoporus</i>	X	X	X		X	X		X	Larson et al. (2000)	
						<i>Neoporus dimidiatus</i> (Gemminger and Harold, 1868)	X	X						X	Larson et al. (2000)	
						<i>Neoporus undulatus</i> (Say, 1823)	X	X			X	X			Larson et al. (2000)	
						<i>Oreodytes</i>	X	X	X		X	X	X	X	Larson et al. (2000); Zimmerman (1985)	
						<i>Oreodytes abbreviatus</i> (Fall, 1923)	X			X					Larson et al. (2000); Zimmerman (1985)	
						<i>Oreodytes alaskanus</i> (Fall, 1926)	X		X				X		Larson et al. (2000); Zimmerman (1985)	
						<i>Oreodytes angustior</i> (Hatch, 1928)	X	X			X	X			Larson et al. (2000); Zimmerman (1985)	
						<i>Oreodytes congruus</i> (LeConte, 1878)	X	X		X	X	X	X		Larson et al. (2000); Zimmerman (1985)	
						<i>Oreodytes crassulus</i> (Fall, 1923)	X	X		X	X	X			Larson et al. (2000); Zimmerman (1985)	
						<i>Oreodytes humboltensis</i> Zimmerman, 1985	X			X					Larson et al. (2000); Zimmerman (1985)	
						<i>Oreodytes laevis</i> (Kirby, 1837)	X		X			X			Larson et al. (2000);	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution				Baja	Literature Cited	Comments	
							Benthic	Lotic		CA	OR	WA	NV	AZ			
						<i>Oreodytes obesus cordillerensis</i> Larson, 1990	X	X		?		X			Zimmerman (1985)		
						<i>Oreodytes obesus obesus</i> (LeConte, 1866)	X	X		X	X				Larson et al. (2000); Zimmerman (1985)	formerly <i>O. rivalis</i> (Gyllenhal)	
						<i>Oreodytes picturatus</i> (Horn, 1883)	X	X		X	X	X	X		Larson et al. (2000); Zimmerman (1985)		
						<i>Oreodytes quadrimaculatus</i> (Horn, 1883)	X	X		X	X	X	X		Larson et al. (2000); Zimmerman (1985)		
						<i>Oreodytes rhyacophilus</i> Zimmerman, 1985	X			X					Larson et al. (2000); Zimmerman (1985)		
						<i>Oreodytes scitulus bisulcatus</i> (Fall, 1923)	X	X		X					Larson et al. (2000); Zimmerman (1985)		
						<i>Oreodytes scitulus scitulus</i> (LeConte, 1855)	X	X		?					Larson et al. (2000); Zimmerman (1985)		
						<i>Oreodytes sierrae</i> Zimmerman, 1985	X			X					Larson et al. (2000); Zimmerman (1985)		
						<i>Oreodytes snoqualmie</i> (Hatch, 1933)	X		X			X			Larson et al. (2000); Zimmerman (1985)		
						<i>Oreodytes subrotundus</i> (Fall, 1923)	X			X					Larson et al. (2000); Zimmerman (1985)		
						<i>Sanfilippodytes</i>	X	X	X	X	X			X	Larson et al. (2000)	Sanfilippodytes currently undergoing revision; best to leave specimens at genus	
						<i>Stictotarsus</i>	X	X	X	X				X	X	Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus aequinoctialis</i> (Clark, 1862)	X		X					X		Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus coelambooides</i> (Fall, 1923)	X			X						Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus corvinus</i> (Sharp, 1887)	X							X		Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus decemsignatus</i> (Clark, 1862)	X							X		Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus deceptus</i> (Fall, 1932)	X	X		X				X		Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus dolerosus</i> (Leech, 1945)	X			X						Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus eximius</i> (Motschulsky,	X			X						Larson et al. (2000);	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Baja	Literature Cited	Comments
							Benthic	Lotic		CA	OR	WA	NV	AZ			
						1859)										Zimmerman (1975, 1982)	
						<i>Stictotarsus expositus</i> (Fall, 1923)	X			X						Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus funereus</i> (Crotch, 1873)	X			X						Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus griseostriatus</i> (DeGeer, 1774)	X	X		X	X	X	X	X		Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus panaminti</i> (Fall, 1923)	X			X						Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus roffi</i> (Clark, 1862)	X							X		Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus spectabilis</i> (Zimmerman, 1982)	X							X		Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stictotarsus striatellus</i> (LeConte, 1852)	X	X		X	X	X	X	X		Larson et al. (2000); Zimmerman (1975, 1982)	
						<i>Stygoporus</i>				X						Larson et al. (2000)	monotypic; stygobiontic
						<i>Stygoporus oregonensis</i> Larson and Labonte, 1994				X						Larson et al. (2000)	monotypic; stygobiontic
	Colymbetinae						X	X	X	X	X	X	X	X	Larson et al. (2000)		
	Agabini						X	X	X	X	X	X	X	X	Larson et al. (2000)		
		<i>Agabinus</i>					X	X		X	X	X				Larson et al. (2000)	
						<i>Agabinus glabrellus</i> (Motschulsky, 1859)	X	X		X	X	X				Larson et al. (2000)	
						<i>Agabinus sculpturellus</i> Zimermann, 1919	X	X		X	X					Larson et al. (2000)	
						<i>Agabus</i>	X	X	X	X	X	X	X	X	Larson et al. (2000)		
						<i>Agabus ambiguus</i> (Say, 1823)	X	X				X				Larson et al. (2000)	
						<i>Agabus ancillus</i> Fall, 1922	X		X		X	X				Larson et al. (2000)	
						<i>Agabus anthracinus</i> Mannerheim, 1852	X	X		X		X				Larson et al. (2000)	
						<i>Agabus apache</i> Young, 1981	X	X						X		Larson et al. (2000)	
						<i>Agabus approximatus</i> Fall, 1922	X	X		X	X		X	X		Larson et al. (2000)	
						<i>Agabus austini</i> Sharp, 1882	X	X		X	X	X	X			Larson et al. (2000)	
						<i>Agabus austrodiscors</i> Larson, 1996	X	X		X						Larson et al. (2000)	
						<i>Agabus bifarius</i> (Kirby, 1837)	X		X			X				Larson et al. (2000)	
						<i>Agabus bjorkmanae</i> Hatch, 1939	X	X		X	X	X	X			Larson et al. (2000)	

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							Benthic	Lotic		CA	OR	WA	NV	AZ		
						<i>Agabus brevicollis</i> LeConte, 1857	X	X		X					Larson et al. (2000)	
						<i>Agabus canadensis</i> Fall, 1922	X		X			X			Larson et al. (2000)	
						<i>Agabus confertus</i> LeConte, LeConte, 1861	X	X		X	X	X			Larson et al. (2000)	
						<i>Agabus cordatus</i> (LeConte, 1853)	X	X						X	Larson et al. (2000)	
						<i>Agabus discors</i> LeConte, 1861	X		X	X	X	X			Larson et al. (2000)	
						<i>Agabus disintegratus</i> (Crotch, 1873)	X		X	X	X		X	X	Larson et al. (2000)	
						<i>Agabus erichsoni</i> Gemminger and Harold, 1868		X		X					Larson et al. (2000)	
						<i>Agabus euryomus</i> Larson, 1996	X	X		X	X				Larson et al. (2000)	
						<i>Agabus griseipennis</i> LeConte, 1859	X		X	X	X	X	X	X	Larson et al. (2000)	
						<i>Agabus hoppingi</i> Leech, 1942	X	X		X					Larson et al. (2000)	
						<i>Agabus hypomelas</i> Mannerheim, 1843		X	X	X	X	X			Larson et al. (2000)	
						<i>Agabus illybiiformis</i> (Zimmermann, 1928)	X	X		X	X				Larson et al. (2000)	
						<i>Agabus jimzim</i> Larson, 1996	X						X		Larson et al. (2000)	
						<i>Agabus klamathensis</i> Larson & Leech, 1989	X	X		X	X				Larson et al. (2000)	
						<i>Agabus kootenai</i> Larson, 1991	X		X	X	X				Larson et al. (2000)	
						<i>Agabus lineelus</i> LeConte, 1861	X		X	X					Larson et al. (2000)	
						<i>Agabus lugens</i> LeConte, 1852	X	X		X	X				Larson et al. (2000)	
						<i>Agabus lutosus</i> LeConte, 1853	X		X	X	X			X	Larson et al. (2000)	
						<i>Agabus minnesotensis</i> Wallis, 1933	X	X				X			Larson et al. (2000)	
						<i>Agabus morosus</i> LeConte, 1852	X	X		X	X				Larson et al. (2000)	
						<i>Agabus obliteratus nectris</i> Leech, 1942	X	X			X	X			Larson et al. (2000)	
						<i>Agabus obliteratus obliteratus</i> LeConte, 1859	X	X		X			X	X	Larson et al. (2000)	
						<i>Agabus oblongulus</i> Fall, 1922	X		X		X	X			Larson et al. (2000)	
						<i>Agabus obsoletus</i> LeConte, 1858	X	X		X			X		Larson et al. (2000)	
						<i>Agabus pandurus</i> Leech, 1942	X	X		X					Larson et al. (2000)	
						<i>Agabus perplexus</i> Sharp, 1882	X	X		X	X	X			Larson et al. (2000)	
						<i>Agabus pisobius</i> Leech, 1949	X		X			X			Larson et al. (2000)	
						<i>Agabus punctulatus</i> Aube, 1838	X		X	X	X	X		X	Larson et al. (2000)	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Literature Cited	Comments	
							Benthic	Lotic		CA	OR	WA	NV	AZ			
						<i>Agabus regularis</i> (LeConte, 1852)	X			X					X	Larson et al. (2000)	
						<i>Agabus roguus</i> Larson, 1997	X	X			X					Larson et al. (2000)	Curry Co., OR
						<i>Agabus rumppi</i> Leech, 1964	X	X		X			X			Larson et al. (2000)	
						<i>Agabus sasquatch</i> Larson, 1991	X		X	X			X			Larson et al. (2000)	
						<i>Agabus semipunctatus</i> (Kirby, 1837)	X		X			X				Larson et al. (2000)	
						<i>Agabus semivittatus</i> LeConte, 1852	X	X		X			X	X		Larson et al. (2000)	
						<i>Agabus seriatus</i> (Say, 1823)	X	X		X	X	X	X	X		Larson et al. (2000)	
						<i>Agabus smithi</i> Brown, 1930	X				X	X				Larson et al. (2000)	
						<i>Agabus strigulosus</i> (Crotch, 1873)	X		X	X	X	X	X			Larson et al. (2000)	
						<i>Agabus tristis</i> Aube, 1838	X	X		X	X	X		X		Larson et al. (2000)	
						<i>Agabus vandykei</i> Leech, 1942	X		X	X						Larson et al. (2000)	
						<i>Agabus vancouverensis</i> Leech, 1937	X		X			X				Larson et al. (2000)	
						<i>Agabus versimilis</i> Brown, 1932	X		X		X	X				Larson et al. (2000)	
						<i>Agabus walsinghami</i> (Crotch, 1873)	X	X		X	X	X				Larson et al. (2000)	
						<i>Ilybius</i>		X	X		X	X	X	X		Larson et al. (2000); Larson (1987)	
						<i>Ilybius angustior</i> (Gyllenhal, 1808)	X		X					X		Larson et al. (2000); Larson (1987)	
						<i>Ilybius fraterculus</i> LeConte, 1862	X		X		X	X	X	X		Larson et al. (2000); Larson (1987)	
						<i>Ilybius picipes</i> (Kirby, 1837)	X		X			X				Larson et al. (2000); Larson (1987)	
						<i>Ilybius quadrimaculatus</i> Aube, 1838	X		X		X	X	X			Larson et al. (2000); Larson (1987)	
					Coptotomini		X			X	X	X	X			Larson et al. (2000)	
					<i>Coptotomus</i>		X	X		X	X	X	X			Larson et al. (2000)	
					<i>Coptotomus longulus longulus</i> LeConte, 1852		X	X		X	X	X	X			Larson et al. (2000)	
					Colymbetini		X	X	X		X	X	X	X		Larson et al. (2000)	
					<i>Rhantus</i>		X	X	X		X	X	X	X		Larson et al. (2000); Zimmerman (1975)	
					<i>Rhantus anisonychus</i> Crotch, 1873		X			X					Larson et al. (2000); Zimmerman (1975)		
					<i>Rhantus atricolor</i> (Aube, 1838)		X							X	Larson et al. (2000); Zimmerman (1975)		

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Baja	Literature Cited	Comments
							Benthic	Lotic		CA	OR	WA	NV	AZ			
						<i>Rhantus binotatus</i> (Harris, 1828)	X			X	X	X	X	X		Larson et al. (2000); Zimmerman (1975)	
						<i>Rhantus consimilis</i> Motschulsky, 1859	X	X		X	X	X	X			Larson et al. (2000); Zimmerman (1975)	
						<i>Rhantus gutticollis</i> (Say, 1834)	X	X		X	X	X	X	X		Larson et al. (2000); Zimmerman (1975)	
						<i>Rhantus sericans</i> Sharp, 1882	X	X		X	X	X				Larson et al. (2000); Zimmerman (1975)	
						<i>Rhantus sinuatus</i> (LeConte, 1862)	X	X				X				Larson et al. (2000); Zimmerman (1975)	
						<i>Rhantus suturellus</i> (Harris, 1828)	X	X				X				Larson et al. (2000); Zimmerman (1975)	
						<i>Rhantus wallisi</i> Hatch, 1953	X	X		X	X	X				Larson et al. (2000); Zimmerman (1975)	
						<i>Colymbetes</i>	X	X		X	X	X	X	X		Larson et al. (2000)	
						<i>Colymbetes crotchi</i> Sharp, 1882	X	X		X						Larson et al. (2000)	
						<i>Colymbetes densus</i> LeConte, 1859	X	X		X	X					Larson et al. (2000)	two recognized subspecies with possible intergrades
						<i>Colymbetes incognitus</i> Zimmerman, 1981	X	X		X	X	X	X	X		Larson et al. (2000)	
						<i>Colymbetes strigatus</i> LeConte, 1851	X	X		X						Larson et al. (2000)	
						Dytiscinae	X	X	X	X	X	X	X	X		Larson et al. (2000)	
						Dytiscini	X			X	X	X	X	X		Larson et al. (2000)	
						<i>Dytiscus</i>	X	X		X	X	X	X	X		Larson et al. (2000)	
						<i>Dytiscus alaskanus</i> Balfour-Browne, 1944	X	X				X				Larson et al. (2000)	
						<i>Dytiscus circumcinctus</i> Ahrens, 1811	X	X				X				Larson et al. (2000)	
						<i>Dytiscus cordieri</i> Aube, 1838	X	X		X	X	X				Larson et al. (2000)	
						<i>Dytiscus dauricus</i> Gebler, 1832	X	X		X	X	X	X	X		Larson et al. (2000)	
						<i>Dytiscus habilis</i> Say, 1834	X	X						X		Larson et al. (2000)	
						<i>Dytiscus hatchi</i> Wallis, 1950	X	X		X	X	X				Larson et al. (2000)	
						<i>Dytiscus hybridus</i> Aube, 1838	X	X			X					Larson et al. (2000)	
						<i>Dytiscus marginicollis</i> LeConte, 1845	X	X		X	X	X	X	X		Larson et al. (2000)	
						Hydaticini	X	X		X	X	X				Larson et al. (2000)	
						<i>Hydaticus</i>	X	X		X	X	X				Larson et al. (2000)	

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							Benthic	Lotic		CA	OR	WA	NV	AZ				
						<i>Hydaticus aruspex</i> Clark, 1864	X	X		X	X	X				Larson et al. (2000)		
						<i>Aciliini</i>	X	X		X	X	X	X			Larson et al. (2000)		
						<i>Acilius</i>	X	X		X	X	X	X			Larson et al. (2000)		
						<i>Acilius abbreviatus</i> Mannerheim, 1843	X	X		X	X	X	X			Larson et al. (2000)		
						<i>Graphoderus</i>	X	X		X		X				Larson et al. (2000)		
						<i>Graphoderus liberus</i> (Say, 1825)	X	X	?		X					Larson et al. (2000)	CA record unpublished	
						<i>Graphoderus occidentalis</i> Horn, 1883	X	X		X	X	X				Larson et al. (2000)		
						<i>Graphoderus perplexus</i> Sharp, 1882	X	X		X		X				Larson et al. (2000)		
						<i>Thermonectus</i>	X	X		X	X			X		Larson et al. (2000)		
						<i>Thermonectus intermedius</i> Crotch, 1873	X	X		X	X					Larson et al. (2000)		
						<i>Thermonectus marmoratus</i> Hope, 1832	X	X		X						Larson et al. (2000)		
						<i>Thermonectus nigrofasciatus</i> <i>nigrofasciatus</i> Aube, 1838	X	X						X		Larson et al. (2000)		
						<i>Thermonectus sibleyi</i> Goodhue-McWilliams, 1981	X	X						X		Larson et al. (2000)		
						<i>Eretini</i>	X			X				X		Larson et al. (2000)		
						<i>Eretes</i>	X			X				X		Larson et al. (2000)		
						<i>Eretes sticticus</i> (Linnaeus, 1767)	X			X				X		Miller (2002)		
						<i>Cybistrini</i>	X	X		X			X			Larson et al. (2000)		
						<i>Cybister</i>	X	X		X			X			Larson et al. (2000)		
						<i>Cybister ellipticus</i> LeConte, 1851	X	X		X						Larson et al. (2000)		
						<i>Cybister explanatus</i> LeConte, 1851	X	X		X			X			Larson et al. (2000)		
						<i>Gyrinidae</i>	X	X	X		X	X	X	X	X		adults not benthic; generally discarded from benthic sets	
						<i>Gyrininae</i>	X	X	X		X	X	X	X	X			
						<i>Enhydrini</i>	X	X	X		X				X	X		
						<i>Dineutus</i>	X	X	X		X				X	X	Leech and Chandler (1956); Wood (1962)	no recent published key for North American species
						<i>Orectochilini</i>	X	X			X				X			
						<i>Gyretes</i>	X	X			X				X		Babin (2004)	
						<i>Gyrinini</i>	X	X	X		X	X	X	X			Oygur and Wolfe (1992)	
						<i>Gyrinus</i>	X	X	X		X	X	X	X			Oygur and Wolfe (1992)	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Distribution					Literature Cited	Comments		
							Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ		
		Haliplidae				X		X		X		X			X	Leech and Chandler (1956)	the species keys in Usinger are still the most recent
			Apterapiplis			X		X									vernal pools only; this genus may be sunk under Haliplus at some point
				Apterapiplis parvulus	(Roberts, 1913)	X		X		X		X					vernal pools only; this genus may be sunk under Haliplus at some point
			Brychius			X				X							
				Brychius hornii	Crotch, 1873	X				X							
				Brychius pacificus	Carr, 1928	X				X							
			Haliplus			X				X					X		
				Haliplus concolor	LeConte, 1852	X				X					X		
				Haliplus cylindricus	Roberts, 1913	X				X							
				Haliplus distinctus	Wallis, 1933	X				X						Kenner (2005)	
				Haliplus dorsomaculatus	Zimmermann, 1924	X				X							
				Haliplus gracilis	Roberts, 1913	X				X							
				Haliplus leechi	Wallis, 1933	X				X							
				Haliplus longulus	LeConte, 1859	X				X						Kenner (2005)	
				Haliplus mimeticus	Matheson, 1912	X				X							
				Haliplus robertsi	Zimmermann, 1924	X				X							
				Haliplus rugosus	Roberts, 1913	X				X							
				Haliplus subguttatus	Roberts, 1913	X				X							
			Peltodytes			X				X					X	Leech and Chandler (1956)	
				Peltodytes callosus	(LeConte, 1852)	X	X	X		X					X	Leech and Chandler (1956)	
				Peltodytes simplex	(LeConte, 1852)	X	X	X		X					X	Leech and Chandler (1956)	
		Noteridae				X		X		X							
				Suphisellus		X		X		X							
					Suphisellus bicolor	(Say, 1831)	X		X		X						
		Polyphaga															
		Chrysomelidae								X							
		Curculionidae								X							
		Dryopidae				X				X	X	X	X	X	Brown (1972)	larvae are primarily terrestrial; occasionally in headwater seeps	
			Dryops			X	X			X				X	Brown (1972)	riparian; seldomly taken in benthic samples	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Baja	Literature Cited	Comments
							Benthic	Lotic		CA	OR	WA	NV	AZ			
						<i>Dryops arizonensis</i> Schaeffer, 1905	X	X		X				X		Brown (1972)	
						<i>Helichus</i>	X	X		X	X	X	X	X		Brown (1972); Nelson (1989)	
						<i>Helichus columbianus</i> Brown, 1931	X	X		X	X	X	X	X		Brown (1972); Nelson (1989); Nelson (1981)	
						<i>Helichus striatus</i> LeConte, 1852	X	X		X	X	X	X	X		Brown (1972); Nelson (1989)	
						<i>Helichus suturalis</i> LeConte, 1852	X	X		X				X		Brown (1972); Nelson (1989)	
						<i>Postelichus</i>	X	X		X				X		Brown (1972); Nelson (1989)	
						<i>Postelichus immsi</i> (Hinton, 1937)	X	X		X				X		Brown (1972); Nelson (1989)	
						<i>Postelichus productus</i> (LeConte, 1852)	X	X		X						Brown (1972); Nelson (1989)	
	Elmidae						X	X	X							Shepard (2002); White and Brigham (1996); Brown (1972)	Shepard's updated generic key to elmid adults includes <i>Xenelmis</i> but not the undescribed genus known to occur in the Pacific Northwest.
		Larinae					X	X	X								
		Larini					X	X	X								
		Lara					X	X	X								
		<i>Lara avara</i> LeConte, 1852					X	X	X	X						Brown (1972)	
		<i>Lara gehringi</i> Darlington, 1929					X	X	X	X	X	X				Brown (1972)	may be a synonym of <i>Lara avara</i>
	Elminiae						X	X	X	X	X	X	X	X			
		Elmini					X	X	X	X	X	X	X	X			
		<i>Ampumixis</i>					X										monotypic
		<i>Ampumixis dispar</i> (Fall, 1925)					X	X		X							monotypic
		<i>Atractelmis</i>					X	X		X							monotypic
		<i>Atractelmis wawona</i> Chandler, 1954					X	X		X							monotypic
		<i>Cleptelmis</i>					X	X		X						Shepard (1998)	monotypic
		<i>Cleptelmis addenda</i> (Fall, 1907)					X	X		X						Shepard (1998)	monotypic
		<i>Cylloepus</i>					X	X						X			
		<i>Cylloepus abnormis</i> (Horn, 1870)					X	X					X			Brown (1972)	
		<i>Cylloepus parkeri</i> Sandeson, 1953					X	X					X			Brown (1972)	
		<i>Dubiraphia</i>					X	X	X	X							

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution				Baja	Literature Cited	Comments	
							Benthic	Lotic		CA	OR	WA	NV	AZ			
						<i>Dubiraphia brunnescens</i> (Fall, 1925)	X	X	X		X				Brown (1972)	Lake Co., Clear Lake	
						<i>Dubiraphia giulianii</i> (van Dyke, 1949)	X	X	?		X				Brown (1972); Shepard (1993)	may be a synonym of <i>Dubiraphia brunnescens</i>	
						<i>Heterelmis</i>	X	X		X				X			
						<i>Heterelmis glabra</i> (Horn, 1870)	X	X						X	Brown (1972b)		
						<i>Heterelmis obesa</i> Sharp, 1882	X	X		X				X	Brown (1972b)		
						<i>Heterelmis stephani</i> Brown, 1972	X	X						X	Brown (1972b)		
						<i>Heterlimnius</i>	X	X		X							
						<i>Heterlimnius corpulentus</i> (LeConte, 1874)	X	X		X					Brown (1972)		
						<i>Heterlimnius koebelei</i> (Martin, 1927)	X	X		X					Brown (1972)		
						<i>Hexacycloepus</i>	X	X						X		unpublished records for AZ	
						<i>Macrelmis</i>	X	X						X	Brown (1972)		
						<i>Macrelmis moestus</i> (Horn, 1870)	X	X						X	Brown (1972)	may be a synonym of <i>Macrelmis texanus</i> Schaeffer, 1911	
						<i>Microcylloepus</i>	X	X		X				X		there are unpublished records of additional species in the SW	
						<i>Microcylloepus formicoideus</i> Shepard, 1990	X	X		X					Shepard (1990)	occurs in desert springs	
						<i>Microcylloepus similis</i> (Horn, 1870)	X	X		X				X	Shepard (1993)	widespread in the West	
						<i>Narpus</i>	X	X		X				X	Brown (1972)		
						<i>Narpus angustus</i> Casey, 1893)	X	X		X					Brown (1972)		
						<i>Narpus arizonicus</i> (Brown, 1930)	X	X						X	Brown (1972)		
						<i>Narpus concolor</i> (LeConte, 1881)	X	X		X					Brown (1972)		
						<i>Neocylloepus</i>	X	X						X	Shepard (2002); White and Brigham (1996)	indeterminate species	
						<i>Neoelmis</i>	X	X						X	Shepard (2002); White and Brigham (1996)	indeterminate species	
						<i>Optioservus</i>	X	X		X	X	X	X	X	Shepard (2002); White (1978); Shepard (1993)	several Western species may not be valid	
						<i>Ordobrevia</i>	X	X		X					Shepard (2002); White and Brigham (1996)	only one species in North America	
						<i>Ordobrevia nubifera</i> (Fall, 1901)	X	X		X					Shepard (2002); White and Brigham (1996)	only one species in North America	
						<i>Rhizelmis</i>	X	X		X					Shepard (2002); White and Brigham (1996)	monotypic	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Literature Cited	Comments	
							Benthic	Lotic		CA	OR	WA	NV	AZ	Baja		
						<i>Rhizelmis nigra</i> Chandler, 1954	X	X		X					Shepard (2002); White and Brigham (1996)	monotypic	
						<i>Stenelmis</i>	X	X		X	X	X	X	?	Shepard (2002); White and Brigham (1996)	<i>S. occidentalis</i> is the only species occurring outside of Nevada springs	
						<i>Stenelmis calida</i> Chandler, 1949	X	X				X			Schmude (1999)	Key designed for <i>Stenelmis</i> of the Nevada springs, but will serve for the West in general	
						<i>Stenelmis lariversi</i> Schmude, 1999	X	X				X			Schmude (1999)	Key designed for <i>Stenelmis</i> of the Nevada springs, but will serve for the West in general	
						<i>Stenelmis moapa</i> LaRivers, 1949	X	X				X			Schmude (1999)	Key designed for <i>Stenelmis</i> of the Nevada springs, but will serve for the West in general	
						<i>Stenelmis occidentalis</i> Schmude and Brown, 1991	X	X		X		X	?		Schmude (1999)	Key designed for <i>Stenelmis</i> of the Nevada springs, but will serve for the West in general	
						<i>Xenelmis</i>	X	X					X		Shepard (2002); Brown (1985); Brown (1981)		
						<i>Xenelmis sandersoni</i> Brown, 1985	X	X					X		Shepard (2002); Brown (1985); Brown (1981)	only species from the USA; larvae still not included in generic keys, but easily identifiable	
						<i>Macronychini</i>	X	X		X	X	X	X	X			
						<i>Zaitzevia</i>	X	X		X	X	X	X	X	Brown (1972); Brown (2001)		
						<i>Zaitzevia parvula</i> (Horn, 1870)	X	X		X	X	X	X	X	Brown (2001)		
						<i>Zaitzevia posthonia</i> Brown, 2001	X	X		X	?						
						<i>Eulichadidae</i>	X			X					Brown (1972)	formerly placed in the Ptilodactylidae; adults terrestrial	
						<i>Stenocolus</i>	X			X					Brown (1972)	adults terrestrial	
						<i>Stenocolus scutellaris</i> LeConte, 1853	X			X					Brown (1972)	adults terrestrial	
						<i>Georissidae</i>				X						some authors consider this a subfamily of Hydrophilidae	
						<i>Georissus</i>				X						shoredwellers	
						<i>Georissus californicus</i> LeConte, 1874				X						shoredwellers	
						<i>Heteroceridae</i>				X	X	X	X	X	Pacheco (1978)	larvae and adults shoredwellers	
						<i>Hydraenidae</i>	X	X	X	X	X	X	X	X			
						<i>Hydraeninae</i>	X	X	X	X	X	X	X	X			
						<i>Hydraenini</i>	X	X	X	X	X	X	X	X			
						<i>Hydraena</i>	X	X	X	X	X	X	X	X	Perkins (1980); Perkins (2001)	Found along stream margins, also some lentic situations	
						<i>Limnebius</i>				X	X	X		X	Perkins (1980); Perkins (2001)		

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Distribution				Literature Cited		Comments	
							Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	
					Ochthebiinae		X	X	X	X	X	X	X	X	X	
					<i>Gymnothebius</i>					X	X			X	X	Perkins (1980); Perkins (2001)
					<i>Neochthebius</i>					X	?	?				Perkins (1980); Perkins (2001)
					<i>Neochthebius vandykei</i> (Knisch, 1924)					X	?	?				intertidal, found in rock crevices from CA to BC
					<i>Ochthebius</i>		X	X	X		X	X	X	X	X	Perkins (1980); Perkins (2001)
					Hydrophilidae		X	X	X		X	X	X	X	X	Smetana (1988); Leech and Chandler (1956)
					<i>Ametor</i>		X	X			X	X	X			Smetana (1988); Leech and Chandler (1956)
					<i>Ametor latus</i> (Horn, 1873)		X	X			X	X	X			Smetana (1988); Leech and Chandler (1956)
					<i>Ametor scabrosus</i> (Horn, 1873)		X	X			X	X	X			Smetana (1988); Leech and Chandler (1956)
					<i>Anacaena</i>		X	X	X		X					Leech and Chandler (1956)
					<i>Anacaena limbata</i> (Fabricius, 1792)		X	X	X		X					Smetana (1988); Leech and Chandler (1956)
					<i>Anacaena signaticollis</i> (Fall, 1924)		X				X					This name probably represents a species complex
					<i>Berosus</i>		X				X					Miller (1965); van Tassel (1966) revision of <i>Berosus</i> remains unpublished; species keys should be used with caution
					<i>Berosus fraternus</i> LeConte, 1855		X				X		X			Leech and Chandler (1956) <i>B. californicus</i> now a synonym
					<i>Berosus infuscatus</i> LeConte, 1855		X				X		X			Leech and Chandler (1956)
					<i>Berosus ingeminatus</i> d'Orchymont, 1946		X				X					Leech and Chandler (1956)
					<i>Berosus maculosus</i> Mannerheim, 1853		X				X					Leech and Chandler (1956)
					<i>Berosus metalliceps</i> Sharp, 1882		X				X					Leech and Chandler (1956)
					<i>Berosus notapeltatus</i> van Tassell, 1963		X							X		van Tassell (1963)
					<i>Berosus punctatissimus</i> LeConte, 1852		X				X			X		Leech and Chandler (1956)
					<i>Berosus striatus</i> (Say, 1823)		X				X					Leech and Chandler (1956)
					<i>Berosus stylifera</i> Horn 1873		X				X			X		Leech and Chandler (1956)

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Baja	Literature Cited	Comments	
							Benthic	Lotic		CA	OR	WA	NV	AZ				
						<i>Chaetarthria</i>	X			X						Miller (1974)		
						<i>Chaetarthria bicolor</i> Sharp,	X			X						Miller (1974)		
						<i>Chaetarthria hespera</i> Miller, 1974	X			X						Miller (1974)		
						<i>Chaetarthria leechi</i> Miller, 1974	X			X						Miller (1974)		
						<i>Chaetarthria magna</i> Miller, 1974	X			X						Miller (1974)		
						<i>Chaetarthria nigrella</i> (LeConte, 1861)	X			X						Miller (1974)		
						<i>Chaetarthria ochra</i> Miller, 1974	X			X						Miller (1974)		
						<i>Chaetarthria pallida</i> (LeConte, 1861)	X			X						Miller (1974)		
						<i>Chaetarthria punctulata</i> Sharp,	X			X						Miller (1974)		
						<i>Chaetarthria pusilla</i> Sharp,	X			X						Miller (1974)		
						<i>Chaetarthria spinata</i> Miller, 1974	X			X						Miller (1974)		
						<i>Chaetarthria truncata</i> Miller, 1974	X			X						Miller (1974)		
						<i>Crenitis</i>	X	X	X	X	X	X	X	X		Miller (1965); Smetana (1988)		
						<i>Crenitis alticola</i> (Fall, 1924)	X	?	?	X	X	X		X		Miller (1965)		
						<i>Crenitis dissimilis</i> (Horn, 1873)	X			X						Miller (1965); Smetana (1988)		
						<i>Crenitis malkini</i> Miller, 1965	X	X			X					Miller (1965); Smetana (1988)		
						<i>Crenitis morata</i> (Horn, 1890)	X		X	X						Smetana (1988)		
						<i>Crenitis palpalis</i> Miller, 1965	X			X	X					Miller (1965)		
						<i>Crenitis paradigma</i> (d'Orchymont, 1942)	X		X		X	X				Smetana (1988)		
						<i>Crenitis rufiventris</i> (Horn, 1873)	X		X	X				X		Smetana (1988)		
						<i>Crenitis seriellus</i> (Fall, 1924)	X			X								
						<i>Crenitis snoqualmie</i> Miller, 1965	X	?			X	X				Miller (1965)		
						<i>Cymbiodyta</i>	X	X	X	X	X	X	X	X		Smetana (1974)		
						<i>Cymbiodyta acuminata</i> Fall, 1924	X				X					Smetana (1974)		
						<i>Cymbiodyta arizonica</i> Smetana, 1974	X						X			Smetana (1974)		
						<i>Cymbiodyta columbiiana</i> Leech, 1948	X	X	X	X	X	X				Smetana (1974)		
						<i>Cymbiodyta dorsalis</i> (Motschulsky, 1859)	X	X	X	X	X	X	X	X		Smetana (1974)		
						<i>Cymbiodyta fraterculus</i> (Sharp, 1882)	X						X			Smetana (1974)		
						<i>Cymbiodyta howdeni</i> Smetana, 1974	X						X			Smetana (1974)		

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Baja	Literature Cited	Comments
							Benthic	Lotic		CA	OR	WA	NV	AZ			
						<i>Cybiodyta imbellis</i> (LeConte, 1861)	X	X	X	X	X					Smetana (1974)	
						<i>Cybiodyta leechi</i> Miller, 1964	X			X	X	X				Smetana (1974)	
						<i>Cybiodyta occidentalis</i> Smetana, 1974	X	?	X	X						Smetana (1974)	
						<i>Cybiodyta pacifica</i> Leech, 1948	X	X	X	X	X	X				Smetana (1974)	
						<i>Cybiodyta pseudopacifica</i> Smetana, 1974	X			X						Smetana (1974)	
						<i>Cybiodyta puella</i> Smetana, 1974	X	X	X	X						Smetana (1974)	
						<i>Cybiodyta punctatostriata</i> (Horn, 1873)	X	X	?	X						Smetana (1974)	
						<i>Cybiodyta seriata</i> Smetana, 1974	X	X						X		Smetana (1974)	
						<i>Cybiodyta vindicata</i> Fall, 1924	X				X					Smetana (1974)	
						<i>Enochrus</i>	X	X	X	X	X	X	X	X	X	Gundersen (1978); Gundersen (1977)	
						<i>Enochrus aridus</i> Gundersen, 1977	X			X					X	Gundersen (1978); Gundersen (1977)	
						<i>Enochrus californicus</i> (Horn, 1890)	X		X	X	X				X	Gundersen (1978); Gundersen (1977)	
						<i>Enochrus carinatus carinatus</i> (LeConte, 1855)	X			X						Gundersen (1978); Gundersen (1977)	
						<i>Enochrus carinatus fucatus</i> (Horn, 1873)	X							X		Gundersen (1978); Gundersen (1977)	
						<i>Enochrus cristatus</i> (LeConte, 1855)	X			X	X	X	X	X	X	Gundersen (1978); Gundersen (1977)	
						<i>Enochrus cuspidatus</i> (LeConte, 1878)	X			X	X		X			Gundersen (1978); Gundersen (1977)	
						<i>Enochrus diffusus</i> (LeConte, 1855)	X			X	X	X	X			Gundersen (1978); Gundersen (1977)	
						<i>Enochrus hamiltoni</i> Leech, 1950	X	X	X	X	X	X				Gundersen (1978); Gundersen (1977)	Several different color morphs exist
						<i>Enochrus ochraceus</i> (Melsheimer, 1844)	X		X	X						Gundersen (1978); Gundersen (1977)	
						<i>Enochrus perplexus</i> (LeConte, 1855)	X			X			X			Gundersen (1978); Gundersen (1977)	
						<i>Enochrus piceus piceus</i> Miller, 1964	X			X	X	X	X	X		Gundersen (1978); Gundersen (1977)	
						<i>Enochrus piceus glabrus</i> Gundersen,	X							X		Gundersen (1978);	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution				Baja	Literature Cited	Comments
							Benthic	Lotic		CA	OR	WA	NV	AZ		
						1977									Gundersen (1977)	
						<i>Enochrus pygmaeus pectoralis</i> (LeConte, 1855)	X		X			X	X	X	Gundersen (1978); Gundersen (1977)	
						<i>Enochrus pygmaeus pygmaeus</i> (Fabricius, 1792)	X		X			X	X		Gundersen (1978); Gundersen (1977)	
						<i>Helochares</i>	X		X							
						<i>Helochares normatus</i> (LeConte, 1861)	X		X							as <i>H. maculicollis</i> Mulsant, 1844
						<i>Hydrochara</i>	X		X						Smetana (1980); Leech and Chandler (1956)	
						<i>Hydrochara lineata</i> LeConte, 1855	X		X			X	X	X	Smetana (1980); Leech and Chandler (1956)	
						<i>Hydrochara rickseckeri</i> Horn, 1895	X		X						Smetana (1980); Leech and Chandler (1956)	Listed as a species of concern; may become federally listed
						<i>Hydrobius</i>	X		X							
						<i>Hydrobius fuscipes</i> (Linnaeus, 1758)	X		X							
						<i>Hydrophilus</i>	X		X						Leech and Chandler (1956)	
						<i>Hydrophilus insularis</i> Laporte, 1840	X		X						Leech and Chandler (1956)	
						<i>Hydrophilus triangularis</i> Say, 1823	X	X	X						Leech and Chandler (1956)	
						<i>Laccobius</i>	X		X							
						<i>Laccobius agilis</i> Randall, 1838	X		X							
						<i>Laccobius californicus</i> d'Orchymont, 1942	X		X							
						<i>Laccobius carri</i> d'Orchymont, 1942	X		X							
						<i>Laccobius ellipticus</i> LeConte, 1855	X		X							
						<i>Laccobius insolitus</i> d'Orchymont, 1942	X		X							
						<i>Paracymus</i>	X		X						Wooldridge (1966)	<i>P. securus</i> not in this key, but all US species are
						<i>Paracymus communis</i> Wooldridge, 1966	X		X			X			Wooldridge (1966)	
						<i>Paracymus confusus</i> Wooldridge, 1966	X					X			Wooldridge (1966)	
						<i>Paracymus elegans</i> (Fall, 1901)	X		X						Wooldridge (1966)	
						<i>Paracymus ellipsis</i> (Fall, 1910)	X		X			X			Wooldridge (1966)	
						<i>Paracymus restrictus</i> Wooldridge, 1966	X		X						Wooldridge (1966)	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Baja	Literature Cited	Comments	
							Benthic	Lotic		CA	OR	WA	NV	AZ				
						<i>Paracymus securus</i> Wooldridge, 1975	X								X	Wooldridge (1975a)		
						<i>Paracymus subcupreus</i> (Say, 1825)	X			X							Wooldridge (1966)	
						<i>Paracymus tarsalis</i> Miller, 1963	X			X							Wooldridge (1966)	
						<i>Tropisternus</i>	X			X							Leech and Chandler (1956)	
						<i>Tropisternus californicus</i> (LeConte, 1855)	X			X							Leech and Chandler (1956)	
						<i>Tropisternus columbianus</i> Brown, 1931	X	X	X	X							Leech and Chandler (1956)	
						<i>Tropisternus ellipticus</i> (LeConte, 1855)	X	X		X	X	X		X			Leech and Chandler (1956)	
						<i>Tropisternus lateralis</i> (Fabricius, 1775)	X	X	X	X	X	X	X	X	X		Leech and Chandler (1956)	
						<i>Tropisternus obscurus</i> Sharp, 1882	X			X							Leech and Chandler (1956)	
						<i>Tropisternus orbus</i> Leech, 1945	X			X							Leech and Chandler (1956)	
						<i>Tropisternus salsamentus</i> Fall, 1901	X			X							Leech and Chandler (1956)	
						<i>Tropisternus sublaevis</i> (LeConte, 1855)	X			X							Leech and Chandler (1956)	
		Helophoridae					X										some authors consider this as a subfamily of Hydrophilidae	
						<i>Helophorus</i>	X											
		Hydrochidae					X										some authors consider this as a subfamily of Hydrophilidae	
						<i>Hydrochus</i>	X											
		Lampyridae						X									larvae are shoredwellers, not truly aquatic	
						<i>Pyractomena</i>		X									emergent vegetation of ponds and marshes	
		Limnichidae								X	X	X		X			larvae and adults shoredwellers	
		Lutrochidae					X	X							X		Brown (1972); Brown and Murvosh (1970) adults terrestrial	
						<i>Lutrochus</i>	X	X							X		Brown (1972); Brown and Murvosh (1970) adults terrestrial	
						<i>Lutrochus arizonensis</i> Brown and Murvosh, 1970	X	X						X		Brown (1972); Brown and Murvosh (1970) adults terrestrial		
		Psephenidae					X	X		X	X	X	X	X	X		Brown (1972); Shepard (1993)	
		Eubriinae					X	X		X	X						Brown (1972); Shepard (1993)	

Order	Suborder	Family	Subfamily	Tribe	Genus	Species	Habitat		Estuarine	Distribution					Literature Cited	Comments
							Benthic	Lotic		CA	OR	WA	NV	AZ	Baja	
						<i>Acneus</i>	X	X		X	X				Brown (1972); Shepard (1993)	larvae not separable to species
						<i>Eubrianacinae</i>	X	X		X	X		X		Brown (1972); Shepard (1993)	
						<i>Eubrianax</i>	X	X		X	X		X		Brown (1972); Shepard (1993)	
						<i>Eubrianax edwardsii</i> (LeConte, 1874)	X	X		X	X		X		Brown (1972); Shepard (1993)	only one species in Nearctic Region
						<i>Psepheninae</i>	X	X		X	X	X	X	X	Brown (1972); Brown and Murvosh (1974)	
						<i>Psephenus</i>	X	X		X	X	X	X	X	Brown (1972); Brown and Murvosh (1974)	larvae to genus, except <i>P. falli</i> Casey which is widespread outside of AZ
						<i>Ptilodactylidae</i>	X			X					Brown (1972)	larvae found in mainly in seeps and headwater streams
						<i>Anchycteis</i>	X			X					Brown (1972)	larvae found in mainly in seeps and headwater streams
						<i>Anchycteis velutina</i> Horn, 1880	X			X					Brown (1972)	larvae found in mainly in seeps and headwater streams
						<i>Araeopidius</i>	X			X					Brown (1972)	larvae found in mainly in seeps and headwater streams
						<i>Araeopidius monochus</i> LeConte, 1874	X			X					Brown (1972)	larvae found in mainly in seeps and headwater streams
						<i>Scirtidae</i>		X		X				X	Tetrault (1967)	adults terrestrial; larvae to genus only; all lentic, some lotic in slower microhabitats
						<i>Cyphon</i>	X	X		X						
						<i>Elodes</i>	X	X		X						
						<i>Prionocyphon</i>	X	X					X			
						<i>Scirtes</i>	X	X		X						
						<i>Scarabaeidae</i>				X	X				Rogers (1997)	
						<i>Aphodiinae</i>				X	X				Rogers (1997)	
						<i>Aphodius</i>				X	X				Rogers (1997)	
						<i>Aphodius alternatus</i> Horn, 1887		X		X					Rogers (1997)	surface dweller in some vernal pools
						<i>Staphylinidae</i>				X	X	X	X	X		excluded from benthic datasets

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## Diptera: True Flies

**Standard Effort Level I:** Genus (where possible) -- Chironomidae to family

**Standard Effort Level II:** Genus (where possible) -- Chironomidae to genus

**Standard Taxonomic Reference:** Merritt and Cummins (1996)

Keys to families and genera are given in Merritt and Cummins (Courtney et al., 1996 – larvae; Merritt et al., 1996 – pupae and adults; Byers, 1996 – Tipulidae; Peterson, 1996 – Simuliidae; Walker and Newson, 1996 – Culicidae; Coffman and Ferrington, 1996 – Chironomidae). Stone et al. (1983) is a good source for distributional information. See also McAlpine et al. (1981, 1987, 1989) for additional keys, illustrations, biological and phylogenetic information and bibliographic references for all Diptera families. The Simuliidae have recently been revised for North America (Adler et al., 2004) When identifying chironomids, it may be helpful to have a number of additional texts at hand including Wiederholm (1983), Wiederholm (1986), and Epler (2001). The latter text, although designed for use in North and South Carolina, is well illustrated and has up-to-date keys for many Nearctic genera. It also contains useful information on the hazards of midge larva identification including ecology, nomenclature, slide-mounting, and quality assurance.

Taxonomic Hierarchy							Habitat		Distribution					Literature Cited		Comments		
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
Diptera																		Courtney et al. (1996); Merritt et al. (1996)
Nematocera																		
	Tipulomorpha																	
		Tanyderidae						X	X			X	X					Alexander (1967)
			Protanyderus					X	X			X	X					Alexander (1967)
		Tipulidae						X	X			X	X	X	X	X	X	Byers (1996), Gelhaus (2000)
			Limoniinae					X	X			X	X	X	X	X		Byers (1996), Gelhaus (2000)
				Antocha								X	X	X				Byers (1996), Gelhaus (2000)
					Cryptolabis							X	X	X		X		Byers (1996), Gelhaus (2000)
						Dicranota						X	X	X				Byers (1996), Gelhaus (2000)
						Erioptera						X	X	X	X	X		Byers (1996), Gelhaus (2000)
						Gonomyia						X	X		X	X	X	Byers (1996), Gelhaus (2000)

Taxonomic Hierarchy						Habitat				Distribution					Literature Cited		Comments				
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
									<i>Hesperoconopa</i>	X	X			X	X	X				Byers (1996), Gelhaus (2000)	
									<i>Hexatoma</i>	X	X			X	X	X		X		Byers (1996), Gelhaus (2000)	
									<i>Limnophila</i>	X	X			X	X	X		X		Byers (1996), Gelhaus (2000)	
									<i>Limonia</i>	X	X			X	X	X		X		Byers (1996), Gelhaus (2000)	
									<i>Molophilus</i>	X	X			X	X	X		X		Byers (1996), Gelhaus (2000)	
									<i>Ormosia</i>	X	X			X	X	X				Byers (1996), Gelhaus (2000)	
									<i>Pedicia</i>	X	X			X	X	X				Byers (1996), Gelhaus (2000)	
									<i>Pilaria</i>	X	X				X	X				Byers (1996), Gelhaus (2000)	
									<i>Pseudolimnophila</i>	X	X			X						Byers (1996), Gelhaus (2000)	
									<i>Rhabdomastix</i>	X	X			X	X	X		X		Byers (1996), Gelhaus (2000)	
									Tipulinae	X	X			X	X	X	X	X	X	Byers (1996), Gelhaus (2000)	
									<i>Holorusia</i>	X	X			X	X	X				Byers (1996), Gelhaus (2000)	monotypic
									<i>Holorusia hespera</i> Arnaud and Byers, 1990	X	X			X	X	X				Byers (1996), Gelhaus (2000), Arnaud and Byers (1990)	monotypic
									<i>Prionocera</i>	X	X			X	X					Byers (1996), Gelhaus (2000), Arnaud and Byers (1990)	
									<i>Tipula</i>	X	X			X	X	X	X	X	X	Byers (1996), Gelhaus (2000)	
	Blephariceromorpha																				
		Blephariceridae																			
			Blepharicerinae																		
				Blepharicerini																	
					<i>Agathon</i>				X	X			X	X	X	X					
						<i>Bibiocephala</i>			X	X			X								
							<i>Bibiocephala nigripes</i> Alexander, 1965		X	X			X								
								<i>Blepharicera</i>		X	X			X							
									<i>Philorus</i>	X	X			X							
		Deuterophlebiidae								X	X								Courtney (1990)		
						<i>Deuterophlebia</i>			X	X			X	X	X				Courtney (1990)		
		Psychodomorpha								X	X			X	X	X	X	X	X		
			Psychodidae						X	X			X	X	X		X	X			
					<i>Maruina</i>				X	X			X	X	X				Hogue (1973)		

Taxonomic Hierarchy									Habitat				Distribution							Literature Cited		Comments	
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja				
									<i>Maruina lanceolata</i> (Kincaid, 1899)	X	X			X	X	X			X	Hogue (1973)		2 other spp. Known from Colorado	
									<i>Psychoda</i>	X	X			X	X	X		X					
									<i>Pericomia/Telmatoscopus</i>	X	X			X	X	X		X	X			larvae of these genera incompletely separable	
	Ptychopteromorpha																						
	Ptychopteridae																				found in seeps or stream margins		
									<i>Bittacomorpha</i>	X	X	X		X	X	X		X				rarely shows up in benthic samples	
									<i>Bittacomorphella</i>	X	X			X	X	X	X					rarely shows up in benthic samples	
									<i>Ptychoptera</i>	X	X	X		X	X	X	X	X				most commonly encountered of the three genera (in benthic samples)	
	Culicomorpha																						
	Ceratopogonidae								X	X										Courtney et al. (1996); Glukova (1979)	A number of additional genera may be encountered in benthic samples; larvae and pupae in need of revision		
	Ceratopogoninae																						
									<i>Bezzia/Palpomyia</i>	X	X												
									<i>Ceratopogon</i>	X	X												
									<i>Culicoides</i>	X	X												
									<i>Probezzia</i>	X	X												
									<i>Sphaeromias</i>	X	X												
									<i>Stilobezzia</i>	X	X												
	Dasyheleinae																						
									<i>Dasyhelea</i>	X	X												
	Forcipomyiinae																						
									<i>Atrichopogon</i>	X	X												
									<i>Forcipomyia</i>	X	X												
	Chaoboridae									X		X	X	X									
									<i>Chaoborus</i>		X		X	X	X								
									<i>Eucorethra</i>	X	X			X	?	?						occasionally found in benthic samples; associated with cold springs	
									<i>Eucorethra underwoodi</i> Underwood, 1903	X	X			X	?	?						occasionally found in benthic samples; associated with cold springs	



Taxonomic Hierarchy						Habitat				Distribution				Literature Cited		Comments				
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
								group sensu Pinder and Reiss (1983)												
								<i>Nilothauma</i>	X	X			X							
								<i>Pagastiella</i>	X	X			X							
								<i>Parachironomus</i>	X	X			X							
								<i>Paracladopelma</i>	X	X			X							
								<i>Paralauterborniella nigrohaltere</i> (Malloch, 1915)	X	X			X						monotypic	
								<i>Paratendipes</i>	X	X			X							
								<i>Phaenopsectra</i>	X	X			X							
								<i>Polypedilum</i>	X	X			X							
								<i>Robackia</i>	X	X			X						Wiederholm (1983); Epler (2001)	two species, easily separable
								<i>Robackia claviger</i> (Townes, 1945)	X	X									Wiederholm (1983); Epler (2001)	
								<i>Robackia demeijeri</i> (Kruseman, 1933)	X	X			X						Wiederholm (1983); Epler (2001)	
								<i>Sergentia</i>	X	X			X							
								<i>Stenochironomus</i>	X	X			X							
								<i>Stictochironomus</i>	X	X			X							
								<i>Synendotendipes</i>	X	X			X						Grothaus (1987)	
								<i>Tribelos</i>	X	X			X						Grothaus (1987)	
								<i>Xenochironomus</i>	X	X			X							
								<i>Pseudochironomini</i>	X	X			X							
								<i>Pseudochironomus</i>	X	X			X							
								<i>Tanytarsini</i>	X	X			X							
								<i>Cladotanytarsus</i>	X	X			X							
								<i>Constempellina</i>	X	X			X							
								<i>Micropsectra</i>	X	X			X							
								<i>Paratanytarsus</i>	X	X			X							
								<i>Rheotanytarsus</i>	X	X			X							
								<i>Stempellina</i>	X	X			X							
								<i>Stempellinella</i>	X	X			X						may be synonymous with <i>Zavrelia</i>	

Taxonomic Hierarchy						Habitat				Distribution					Literature Cited		Comments			
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
									<i>Sublettea</i>	X	X		X							
									<i>Tanytarsus</i>	X	X		X							<i>Nimbocera</i> now a synonym of <i>Tanytarsus</i>
									<i>Zavrelia</i>	X	X		X							
									<i>Diamesinae</i>	X	X									
									<i>Boreoheptagyini</i>	X	X									
									<i>Boreoheptagyia</i>	X	X		?		X					
									<i>Diamesini</i>	X	X									
									<i>Diamesa</i>	X	X		X	X	X	X	X			
									<i>Pagastia</i>	X	X		?							
									<i>Potthastia</i>	X	X		?							
									<i>Potthastia gaedii</i> group	X	X		?							
									<i>Potthastia longimana</i> group	X	X		?							
									<i>Pseudodiamesa</i>	X	X		X	X						
									<i>Sympotthastia</i>	X	X		X	X						
									<i>Orthocladiinae</i>	X										
									<i>Acricotopus</i>	X			?							
									<i>Brillia</i>	X	X									
									<i>Cardiocladius</i>	X	X		X			X	X			
									<i>Chaetocladius</i>	X	X				X					
									<i>Chasmatonotus</i>				X	X	X				larvae unknown	
									<i>Clunio</i>											
									<i>Clunio californiensis</i> Hashimoto, 1974				X						inter tidal	
									<i>Corynoneura</i>				?							
									<i>Cricotopus</i>	X	X		X							
									<i>Cricotopus bicinctus</i> group	X	X		X							
									<i>Cricotopus trifascia</i> group	X	X		X							
									<i>Cricotopus nostocicola</i> Wirth, 1957	X	X		X	X				Wirth (1957); Ashe and Murray (1980)	found in blue-green alga <i>Nostoc</i>	
									<i>Doithrix</i>	X	X		X							
									<i>Epoicocladius</i>											
									<i>Eretmoptera</i>											

Taxonomic Hierarchy								Habitat				Distribution				Literature Cited		Comments			
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
									<i>Eretmoptera browni</i> Kellogg, 1900				X							inter tidal; larvae unknown	
									<i>Eukiefferiella</i>	X	X		X								
									<i>Euryhapsis</i>	X	X		X								
									<i>Georthocladius</i>	X	X		X								
									<i>Gymnometriocnemus</i>	X	X		?								
									<i>Heleniella</i>	X	X		X								
									<i>Heterotanytarsus</i>	X	X		?								
									<i>Heterotriocccladius</i>	X	X		X								
									<i>Hydrobaenus</i>	X	X		X								
									<i>Krenosmittia</i>	X	X		X								
									<i>Limnophyes</i>	X	X		X								
									<i>Lopescladius</i>	X	X		?								
									<i>Metrocnemus</i>	X	X		X								
									<i>Nanocladius</i>	X	X		X								
									<i>Orthocladius</i>	X	X		X							genus except for O. ( <i>Sympoziocladius</i> ) <i>lignicola</i> (Kieffer, 1915)	
									<i>Orthocladius lignicola</i> (Kieffer, 1915)	X	X		X	X						<i>Orthocladius</i> ( <i>Sympoziocladius</i> ) <i>lignicola</i> (Kieffer, 1915)	
									<i>Parachaetocladius</i>	X	X		X								
									<i>Parakiefferiella</i>	X	X		X								
									<i>Parametriocnemus</i>	X	X		X								
									<i>Paraphaenocladius</i>	X	X		X								
									<i>Paratrichocladius</i>	X	X		X								
									<i>Parorthocladius</i>	X	X			X						unnamed species	
									<i>Psectrocladius</i>	X	X		X								
									<i>Pseudorthocladius</i>	X	X		X								
									<i>Pseudosmittia</i>	X	X		X								
									<i>Rheocricotopus</i>	X	X		X								
									<i>Smittia</i>	X	X		X								
									<i>Symbiocladius</i>		X		X							phoretic on mayflies	
									<i>Symbiocladius equitans</i>	X		X								phoretic on mayflies	

Taxonomic Hierarchy						Habitat				Distribution					Literature Cited		Comments				
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja		
								(Claassen, 1922)													
								<i>Synorthocladius</i>	X	X			X								
								<i>Tethymyia</i>					X							inter tidal	
								<i>Tethymyia aptena</i> Wirth, 1949					X							inter tidal	
								<i>Thalassosmittia</i>					?							inter tidal	
								<i>Thienemanniella</i>	X	X			X								
								<i>Tvetenia</i>	X	X			X								
								<i>Tvetenia bavarica</i> group sensu Bode, 1983	X	X			X								
								<i>Tvetenia discoloripes</i> group sensu Bode, 1983	X	X			X								
								<i>Podonominae</i>	X	X										Brundin (1983); Brundin (1986)	found in headwater streams
								<i>Boreochlini</i>	X	X										Brundin (1983); Brundin (1986)	
								<i>Boreochlus</i>	X	X			X	X						Brundin (1983); Brundin (1986)	larvae are inseparable to species
								<i>Podonomini</i>	X	X										Brundin (1983); Brundin (1986)	
								<i>Parochlus</i>	X	X			X	?	?					Brundin (1983); Brundin (1986)	
								<i>Parochlus kiefferi</i> (Garrett, 1925)	X	X			X	?	?					Brundin (1983); Brundin (1986)	only species known from North American
								<i>Prodiamesinae</i>	X	X			?							Saether (1983); Saether (1986)	
								<i>Monodiamesa</i>	X	X			?							Saether (1983); Saether (1986)	
								<i>Odontomesa</i>	X	X			?							Saether (1983); Saether (1986)	
								<i>Prodiamesa</i>	X	X			?							Saether (1983); Saether (1986)	
								<i>Tanypodinae</i>	X	X			X	X	X	X	X	X			
								<i>Coelotanypodini</i>	X	X			?								
								<i>Clinotanypus</i>	X	X			X								
								<i>Macropelopini</i>	X	X			X	X	X			X			
								<i>Alotanypus</i>	X	X			X	X	X			X			
								<i>Apsectrotanypus</i>	X	X			X	X	X						
								<i>Brundiniella eumorpha</i> (Sublette, 1964)	X	X			X	X	X					monotypic	
								<i>Derotanypus</i>	X	X			X	X	X	X					
								<i>Macropelopia</i>	X	X			?								

Taxonomic Hierarchy						Habitat				Distribution					Literature Cited		Comments				
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									<i>Psectrotanypus</i>	X	X			X	X	X					
									<i>Radotanypus</i>	X	X			X	X						
									<i>Natarsiini</i>	X	X			X							
									<i>Natarsia</i>	X	X			X							
									<i>Pentaneuriini</i>	X	X			X	X	X	X	X			
									<i>Ablabesmyia</i>	X	X			X	X	X	X	X			
									<i>Conchapelopia</i>	X	X			X		X		X			
									<i>Hayesomyia</i>	X	X			X							
									<i>Krenopelopia</i>	X	X				X						
									<i>Labrundinia</i>	X	X			X				X			
									<i>Larsia</i>	X	X			X							
									<i>Meropelopia</i>	X	X			X							
									<i>Monopelopia</i>	X	X			X							
									<i>Nilotanypus</i>	X	X			X							
									<i>Paramerina</i>	X	X			?	X	X					
									<i>Pentaneura</i>	X	X			X	X	X		X			
									<i>Reomyia</i>	X	X			X							
									<i>Thienemannimyia group</i>	X	X			X	X	X	X	X		includes Arctopelopia, Conchapelopia, Hayesomyia, Helopelopia, Meropelopia, Rheopelopia, Thienemannimyia	
									<i>Thienemannimyia</i>	X	X			X	X	X	X	X			
									<i>Xenopelopia</i>	X	X			X							
									<i>Zavrelimyia</i>	X	X			X	X						
									<i>Procladiini</i>	X	X										
									<i>Procladius</i>	X	X										
									<i>Tanypodini</i>	X	X										
									<i>Tanyplus</i>	X	X										
									<i>Telmatogetoninae</i>										intertidal		
									<i>Telmatogeton</i>										intertidal		
									<i>Culicidae</i>	X	X										
									<i>Aedes</i>									Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited		Comments			
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja				
									<i>Aedes aegypti</i> (Linneaus, 1762)		X						X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Aedes cinereus</i> Meigen, 1918		X		X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Aedes vexans</i> (Meigen, 1830)		X		X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Anopheles</i>											Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Anopheles franciscanus</i> McCracken, 1904		X	X		X	X		X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Anopheles freeborni</i> Aitken, 1939		X	X		X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Anopheles hermsi</i> Barr and Guptavani, 1989		X	X		X						Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Anopheles judithae</i> Zavortnik, 1969		X	X						X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Anopheles occidentalis</i> Dyar and Knab, 1906		X	X		X	X					Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Anopheles punctipennis</i> (Say, 1823)		X	X		X	X	X				Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Culex</i>											Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Culex anips</i> Dyar, 1916			X		X				X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Culex apicalis</i> Adams, 1903			X		X	X		X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Culex arizonensis</i> Bohart, 1948			X					X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Culex boharti</i> Brookman and Reeves, 1950			X		X	X	X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Culex coronator</i> Dyar and Knab, 1906			X					X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Culex erythrothorax</i> Dyar, 1907			X		X			X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		
									<i>Culex interrogator</i> Dyar and Knab, 1906			X		X				X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus		

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited		Comments			
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja				
									<i>Culex pipiens pipiens</i> Linneaus, 1758		X		X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culex quinquefasciatus</i> Say, 1823		X		X			X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culex reevesi</i> Wirth, 1948		X		X						Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culex restuans</i> Theobald, 1901		X		X	X			X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culex salinarius</i> Coquillett, 1904		X			X					Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culex stigmatosoma</i> Dyar, 1907		X		X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culex tarsalis</i> Coquillett, 1896		X		X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culex territans</i> Walker, 1856		X		X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culex thriambus</i> Dyar, 1921		X		X			X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culiseta</i>										Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culiseta impatiens</i> (Walker, 1848)		X		X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culiseta incidunt</i> (Thompson, 1869)		X		X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culiseta inornata</i> (Williston, 1893)		X		X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culiseta minnesotae</i> Barr, 1957		X			X	X				Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culiseta morsitans</i> (Theobald, 1901)		X			X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Culiseta particeps</i> (Adams, 1903)		X		X	X	X	X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Coquillettidia</i>		X								Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Coquillettidia peturbans</i> (Walker, 1856)	X		X		X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			

Taxonomic Hierarchy						Habitat				Distribution							Literature Cited		Comments			
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja			
									<i>Ochlerotatus</i>											Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus aboriginis</i> (Dyar, 1917)		X		X	X						Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus aloponotum</i> (Dyar, 1917)		X			X	X					Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus bicristatus</i> (Thurman and Winkler, 1950)			X								Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus burgeri</i> (Zavortnik)		X							X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus campestris</i> (Dyar and Knab, 1907)			X		X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus cataphylla</i> (Dyar, 1916)		X		X	X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Oclerotatus clivis</i> (Lanzaro and Eldridge, 1992)			X		X						Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus communis</i> (DeGeer, 1776)			X		X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus desrticola</i> (Zavortnik, 1969)		X		X							Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus dorsalis</i> (Meigen, 1830)		X		X	X	X	X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus epactius</i> (Dyar and Knab, 1908)		X		X			X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus excrucians</i> (Walker, 1856)		X			X						Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus fitchii</i> (Felt and Young, 1904)			X		X	X	X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus flavescens</i> (Müller, 1764)			X		X	X	X	X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus hendersoni</i> (Cockerell, 1918)			X					X			Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	
									<i>Ochlerotatus hexodontus</i> Dyar, 1916		X		X	X	X	X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus	

Taxonomic Hierarchy									Habitat				Distribution							Literature Cited		Comments		
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja					
									<i>Ochlerotatus impiger</i> (Walker, 1848)			X			X	X				Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus implicatus</i> (Vockeroth, 1954)			X		X	X	X				Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus increpitus</i> (Dyar, 1916)			X		X	X	X	X			Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus intrudens</i> (Dyar, 1919)			X			X	X				Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus japonicus japonicus</i> (Theobald, 1901)			X								Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus melanimon</i> (Dyar, 1924)			X		X	X	X	X			Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus monticola</i> (Belkin and McDonald, 1957)			X						X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus muelleri</i> (Dyar, 1920)			X						X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus nevadensis</i> Chapman and Barr, 1964			X			X	X	X			Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus nigromaculatus</i> (Ludlow, 1906)			X		X	X	X	X	X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus niphadopsis</i> (Dyar and Knabb, 1917)			X		X	X		X			Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus papago</i> (Zavortnik, 1970)			X						X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus provocans</i> (Walker, 1848)			X			X	X				Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus pullatus</i> (Coquillett, 1904)			X		X	X					Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus purpureipes</i> (Aitken, 1941)			X		X				X	X	Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus schizopinax</i> (Dyar, 1929)			X		X	X		X	X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus sierrensis</i> (Ludlow, 1905)			X		X	X					Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		

Taxonomic Hierarchy									Habitat				Distribution							Literature Cited		Comments			
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja						
									<i>Ochlerotatus sollicitans sollicitans</i> (Walker, 1856)		X		X				X	X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus			
									<i>Ochlerotatus sollicitans idahoensis</i> (Theobald, 1903)			X			X	X	X			Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus			
									<i>Ochlerotatus squamiger</i> (Coquillett, 1902)			X		X					X	Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus			
									<i>Ochlerotatus sticticus</i> (Meigen, 1838)			X		X	X	X				Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus			
									<i>Ochlerotatus taeniorhynchus</i> (Wiedemann, 1821)				X		X				X	X	Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus tahoensis</i> (Dyar, 1916)			X		X							Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus thelcter</i> (Dyar, 1918)			X		X					X	X	Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus trivittatus</i> (Coquillett, 1902)			X							X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus varipalpus</i> (Coquillett, 1902)			X							X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Ochlerotatus ventrovittus</i> (Dyar, 1916)			X		X	X			X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus			
									<i>Ochlerotatus washinoi</i> (Lanzaro and Eldridge, 1992)			X		X	X					Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus			
									<i>Orthopodomyia</i>											Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus			
									<i>Orthopodomyia kummi</i> Edwards, 1939			X							X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus		
									<i>Orthopodomyia signifera</i> (Coquillett, 1896)			X		X	X			X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus			
									<i>Psorophora</i>											Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus			
									<i>Psorophora columbiae</i> (Dyar and Knab, 1906)			X		X			X	X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus			
									<i>Psorophora discolor</i> (Coquillett, 1903)			X						X		Darsie and Ward (2005)		Only fourth instar larvae can be reliably identified beyond genus			

Taxonomic Hierarchy									Habitat				Distribution					Literature Cited			Comments			
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja					
									<i>Psorophora howardii</i> Coquillett, 1901											Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Psorophora signipennis</i> (Coquillett, 1904)		X		X			X	X	X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Toxorhynchites</i>											Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Toxorhynchites moctezuma</i> Dyar and Knab, 1906			X						X		Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Uranotaenia</i>											Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
									<i>Uranotaenia anhydor anhydor</i> Dyar, 1907			X		X			X	X	X	Darsie and Ward (2005)	Only fourth instar larvae can be reliably identified beyond genus			
	Dixidae								<i>Dixa</i>		X	X		X		X	X	X		Cook (1983)				
									<i>Dixella</i>		X	X	X	X	X	X				Cook (1983)				
									<i>Meringodixa</i>		X	X								Cook (1983)				
									<i>Meringodixa chalonensis</i> (Nowell, 1951)		X	X							Cook (1983)					
	Simuliidae									X	X			X	X	X	X	X	X	Adler et al. (2004)				
				Parasimuliinae						X	X			X	X	X				Adler et al. (2004)	streams in coniferous forests dominated by western hemlock			
									<i>Parasimilium</i>		X	X		X	X	X				Adler et al. (2004)	streams in coniferous forests dominated by western hemlock			
									<i>Parasimilium</i> species "A", Adler et al., 2004		X	X				X				Adler et al. (2004)	streams in coniferous forests dominated by western hemlock			
									<i>Parasimilium crosskeyi</i> Peterson, 1977		X	X				X	X			Adler et al. (2004)	streams in coniferous forests dominated by western hemlock			
									<i>Parasimilium furcatum</i> Malloch, 1914		X	X			X	X	X			Adler et al. (2004)	streams in coniferous forests dominated by western hemlock			
									<i>Parasimilium stonei</i> Peterson, 1977		X	X			X	X	X			Adler et al. (2004)	streams in coniferous forests dominated by western hemlock			
				Simuliinae						X	X			X	X	X	X	X	X	Adler et al. (2004)				

Taxonomic Hierarchy					Habitat		Distribution					Literature Cited		Comments						
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									Prosimuliini	X	X		X	X	X	X	X		Adler et al. (2004)	
									Twinnia	X	X		X	X	X				Adler et al. (2004)	headwater streams; impoundment outflows
									<i>Twinnia hirticornis</i> Wood, 1978	X	X		X	X					Adler et al. (2004)	headwater streams; impoundment outflows
									<i>Twinnia nova</i> (Dyar & Shannon, 1927)	X	X				X				Adler et al. (2004)	headwater streams; impoundment outflows
									Helodon	X	X		X	X	X	X			Adler et al. (2004)	
									<i>Helodon pleuralis</i> (Malloch, 1914)	X	X				X				Adler et al. (2004)	
									<i>Helodon clavatus</i> (Peterson, 1970)	X	X				X				Adler et al. (2004)	
									<i>Helodon beardi</i> Adler et al., 2004	X	X		X	X			X		Adler et al. (2004)	
									<i>Helodon chaos</i> Adler et al., 2004	X	X		X	X	X				Adler et al. (2004)	
									<i>Helodon diadelphus</i> Adler et al., 2004	X	X			X	X				Adler et al. (2004)	
									<i>Helodon mcreadieei</i> Adler et al., 2004	X	X		X	X	X				Adler et al. (2004)	
									<i>Helodon newmani</i> Adler et al., 2004	X	X		X	X					Adler et al. (2004)	
									<i>Helodon onchyodactylus</i> (Dyar & Shannon, 1927)	X	X		X	X	X				Adler et al. (2004)	
									<i>Helodon proteus</i> Adler et al., 2004	X	X			X	X				Adler et al. (2004)	
									<i>Helodon susanae</i> (Peterson, 1970)	X	X		X	X	X				Adler et al. (2004)	
									<i>Helodon trochus</i> Adler et al., 2004	X	X					X			Adler et al. (2004)	
									Prosimilium	X	X		X	X	X	X	X		Adler et al. (2004)	
									<i>Prosimilium caudatum</i> Shewell, 1959	X	X		X	X	X				Adler et al. (2004)	
									<i>Prosimilium constrictistylum</i> Peterson, 1970	X	X					X			Adler et al. (2004)	

Taxonomic Hierarchy									Habitat				Distribution					Literature Cited		Comments		
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									<i>Prosimilium davesi</i> Peterson & Defoliart, 1960	X	X				X	X					Adler et al. (2004)	
									<i>Prosimilium dicentrum</i> Dyar & Shannon, 1927	X	X			X	X	X				Adler et al. (2004)		
									<i>Prosimilium dicum</i> Dyar & Shannon, 1927	X	X			X	X	X		X		Adler et al. (2004)		
									<i>Prosimilium doveri</i> Sommerman, 1962 ("1961")							X					Adler et al. (2004)	
									<i>Prosimilium esselbaughi</i> Sommerman, 1964	X	X			X	X	X	X			Adler et al. (2004)		
									<i>Prosimilium exigens</i> Dyar & Shannon, 1927	X	X			X	X	X	X	X		Adler et al. (2004)		
									<i>Prosimilium flaviantennus</i> (Stains & Knowlton, 1940)	X	X			X				X		Adler et al. (2004)		
									<i>Prosimilium formosum</i> Shewell, 1959	X	X			X	X	X		X		Adler et al. (2004)		
									<i>Prosimilium frohnei</i> Sommerman, 1958	X	X			X						Adler et al. (2004)		
									<i>Prosimilium fulvithorax</i> Shewell, 1959	X	X			X	X	X				Adler et al. (2004)		
									<i>Prosimilium fulvum</i> (Coquillet, 1902)	X	X			X	X	X				Adler et al. (2004)		
									<i>Prosimilium idemai</i> Adler et al., 2004	X	X			X						Adler et al. (2004)		
									<i>Prosimilium imposter</i> Peterson, 1970	X	X			X	X			X		Adler et al. (2004)		
									<i>Prosimilium longirostrum</i> Adler et al., 2004	X	X				X					Adler et al. (2004)		
									<i>Prosimilium minifulvum</i> Adler et al., 2004	X	X			X						Adler et al. (2004)		
									<i>Prosimilium rusticum</i> Adler et al., 2004	X	X						X			Adler et al. (2004)		
									<i>Prosimilium secretum</i> Adler et al., 2004	X	X			X						Adler et al. (2004)		

Taxonomic Hierarchy									Habitat				Distribution							Literature Cited		Comments	
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja				
									<i>Prosimilium shewelli</i> peterson & Defolciart, 1960	X	X			X							Adler et al. (2004)		
									<i>Prosimilium travisi</i> Stone, 1952	X	X			X	X	X	X	X			Adler et al. (2004)		
									<i>Prosimilium uinta</i> Peterson & Defolciart, 1960	X	X								X		Adler et al. (2004)		
									<i>Prosimilium unicum</i> (Twinn, 1938)	X	X							X			Adler et al. (2004)		
					Simuliini					X	X			X	X	X	X	X			Adler et al. (2004)		
					<i>Greniera</i>					X	X			X	X	X					Adler et al. (2004)	rarely encountered	
									<i>Greneria "species F"</i> , Adler et al., 2004	X	X			X							Adler et al. (2004)	rarely encountered	
									<i>Greneria humeralis</i> Currie et al., 2004	X	X			X	X	X					Adler et al. (2004)	rarely encountered	
									<i>Greneria denaria</i> (Davies et al., 1962)	X	X					X					Adler et al. (2004)	rarely encountered	
					<i>Stegopterna</i>					X	X			X	X	X	X				Adler et al. (2004)	shallow mountain streams	
									<i>Stegopterna acra</i> Currie et al., 2004	X	X			X			X	X			Adler et al. (2004)	shallow mountain streams	
									<i>Stegopterna permutata</i> (Dyar, & Shannon, 1927)	X	X			X		X					Adler et al. (2004)	shallow mountain streams	
									<i>Stegopterna xantha</i> Currie et al., 2004	X	X			X	X	X					Adler et al. (2004)	shallow mountain streams	
					<i>Tlalocomyia</i>					X	X			X	X			X			Adler et al. (2004)	shallow mountain streams, seeps	
									<i>Tlalocomyia andersoni</i> Currie et al., 2004	X	X			X	X						Adler et al. (2004)	shallow mountain streams, seeps	
									<i>Tlalocomyia osbornii</i> (Stains & Knowlton, 1943)	X	X			X	X	X		X			Adler et al. (2004)	shallow mountain streams, seeps	
									<i>Tlalocomyia ramifera</i> Currie et al., 2004	X	X				X	X					Adler et al. (2004)	shallow mountain streams, seeps	
									<i>Tlalocomyia stewarti</i> (Coleman, 1953)	X	X			X							Adler et al. (2004)	shallow mountain streams, seeps	

Taxonomic Hierarchy					Habitat				Distribution					Literature Cited			Comments			
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja	
									<i>Gigantodax</i>	X	X							X	Adler et al. (2004)	small, high-elevation springs
									<i>Gigantodax adleri</i> Moulton, 1996	X	X							X	Adler et al. (2004)	small, high-elevation springs
									<i>Metacnephia</i>	X	X		X						Adler et al. (2004)	high elevation lake outlets and streams
									<i>Metacnephia jeanae</i> (Defoliart & Peterson, 1960)	X	X		X						Adler et al. (2004)	high elevation lake outlets and streams
									<i>Metacnephia villosa</i> (Defoliart & Peterson, 1960)		X		X						Adler et al. (2004)	high elevation lake outlets and streams
									<i>Simulium</i>	X	X		X	X	X	X	X		Adler et al. (2004)	
									<i>Simulium anduzei</i> Vargas & Diaz Najera, 1948	X	X							X	Adler et al. (2004)	
									<i>Simulium apricarium</i> Adler et al., 2004	X	X		X					X	Adler et al. (2004)	
									<i>Simulium argus</i> Wiliston, 1893	X	X		X	X	X	X	X		Adler et al. (2004)	
									<i>Simulium balteatum</i> Adler et al., 2004	X	X		X	X	X				Adler et al. (2004)	
									<i>Simulium bivittatum</i> Malloch, 1914	X	X			X	X		X		Adler et al. (2004)	
									<i>Simulium brevicercum</i> Knowlton & Rowe, 1934	X	X		X	X	X	X	X		Adler et al. (2004)	
									<i>Simulium bricenoi</i> vargas et al., 1946	X	X						X		Adler et al. (2004)	
									<i>Simulium canadensis</i> Hearle, 1932	X	X		X	X	X	X	X		Adler et al. (2004)	
									<i>Simulium canonicolum</i> (Dyar & Shannon, 1927)	X	X					X	X		Adler et al. (2004)	
									<i>Simulium carbunculum</i> Adler et al., 2004	X	X		X			X	X		Adler et al. (2004)	
									<i>Simulium chromatinum</i> Adler et al., 2004	X	X						X		Adler et al. (2004)	
									<i>Simulium chromocetrum</i> Adler et al., 2004	X	X		X						Adler et al. (2004)	

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited		Comments			
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja				
									<i>Simulium clarum</i> (Dyar & Shannon, 1927)	X	X			X						Adler et al. (2004)			
									<i>Simulium conicum</i> Adler et al., 2004	X	X			X	X	X				Adler et al. (2004)			
									<i>Simulium craigi</i> Stone & Snoddy, 1969	X	X			X					X	Adler et al. (2004)			
									<i>Simulium curiei</i> Adler & Wood, 1991	X	X			X	X	X			X	Adler et al. (2004)			
									<i>Simulium decorum</i> Walker, 1948	X	X			X	X	X	X	X		Adler et al. (2004)			
									<i>Simulium defoliarti</i> Stone & Peterson, 1958	X	X			X	X	X				Adler et al. (2004)			
									<i>Simulium donovani</i> Vargas, 1943	X	X			X	X		X	X		Adler et al. (2004)			
									<i>Simulium encisoi</i> Vargas & Diaz Najera, 1949	X	X			X			X	X		Adler et al. (2004)			
									<i>Simulium freemani</i> Vargas & Diaz Najera, 1949	X	X								X	Adler et al. (2004)			
									<i>Simulium griseum</i> Coquillett, 1898	X	X			X					X	Adler et al. (2004)			
									<i>Simulium hechti</i> Vargas et al., 1946	X	X			X	X	X	X	X		Adler et al. (2004)			
									<i>Simulium hippovorum</i> Malloch, 1914	X	X			X	X	X	X	X		Adler et al. (2004)			
									<i>Simulium hunteri</i> Malloch, 1914	X	X			X	X	X	X	X		Adler et al. (2004)			
									<i>Simulium infernale</i> Adler et al., 2004	X	X			X						Adler et al. (2004)			
									<i>Simulium iriartei</i> Vargas et al., 1946	X	X								X	Adler et al. (2004)			
									<i>Simulium jacumbaiae</i> Dyar & Shannon, 1927	X	X			X	X	X	X	X		Adler et al. (2004)			
									<i>Simulium joculator</i> Adler et al., 2004	X	X			X						Adler et al. (2004)			
									<i>Simulium longithallum</i>	X	X								X	Adler et al. (2004)			

Taxonomic Hierarchy							Habitat				Distribution							Literature Cited		Comments					
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja						
								Diaz najera & Vulcano, 1962 ("1961")																	
								<i>Simulium meridionale</i> Riley, 1887	X	X			X				X				Adler et al. (2004)				
								<i>Simulium modicum</i> Adler et al., 2004	X	X			X		X						Adler et al. (2004)				
								<i>Simulium mysterium</i> Adler et al., 2004	X	X			X								Adler et al. (2004)				
								<i>Simulium nebulosum</i> Currie & Adler, 1986	X	X			X	X	X						Adler et al. (2004)				
								<i>Simulium negativum</i> Adler et al., 2004	X	X							X				Adler et al. (2004)				
								<i>Simulium notatum</i> Adams, 1904	X	X								X				Adler et al. (2004)			
								<i>Simulium paynei</i> Vargas, 1942	X	X								X				Adler et al. (2004)			
								<i>Simulium petersoni</i> Stone & Defoliart, 1959	X	X			X	X		X					Adler et al. (2004)				
								<i>Simulium pilosum</i> (Knowlton & Rowe, 1934)	X	X			X	X	X	X	X				Adler et al. (2004)				
								<i>Simulium piperi</i> Dyar & Shannon, 1927	X	X			X	X	X	X	X				Adler et al. (2004)				
								<i>Simulium pugetense</i> (Dyar & Shannon, 1927)	X	X			X	X	X						Adler et al. (2004)				
								<i>Simulium quadratum</i> (Stains & Knowlton, 1943)		X	X			X		X					Adler et al. (2004)				
								<i>Simulium rostratum</i> (Lundstrom, 1911)	X	X				X	X						Adler et al. (2004)				
								<i>Simulium saxosum</i> Adler et al., 2004	X	X			X	X	X						Adler et al. (2004)				
								<i>Simulium silvestre</i> (Rubtsov, 1956)	X	X			X	X	X						Adler et al. (2004)				
								<i>Simulium tescorum</i> Stone & Boreham, 1965	X	X			X	X	X	X	X	X		Adler et al. (2004)					
								<i>Simulium twinni</i> Stains &	X	X			X	X	X	X	X	X			Adler et al. (2004)				

Taxonomic Hierarchy									Habitat				Distribution							Literature Cited		Comments		
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									Knowlton, 1940															
									<i>Simulium tribulatum</i> Lugger, 1897	X	X			X	X	X	X	X			Adler et al. (2004)			
									<i>Simulium vandalicum</i> Dyar & Shannon, 1927	X	X			X	X	X	X	X			Adler et al. (2004)			
									<i>Simulium venator</i> Dyar & Shannon, 1927	X	X			X	X			X			Adler et al. (2004)			
									<i>Simulium venustum</i> Say, 1823	X	X			X					X			Adler et al. (2004)		
									<i>Simulium virgatum</i> Coquillett, 1902	X	X			X	X	X	X	X			Adler et al. (2004)			
									<i>Simulium vittatum</i> Zetterstedt, 1838	X	X			X	X	X	X	X			Adler et al. (2004)			
									<i>Simulium wyomingense</i> Stone & Defoliart, 1959	X	X			X	X						Adler et al. (2004)			
									<i>Simulium zephyrus</i> Adler et al., 2004	X	X				X	X						Adler et al. (2004)		
									Thaumaleidae		X	X			X								second genus <i>Trichothaumalea</i> is found in British Columbia	
									<i>Thaumalea</i>		X	X			X								Wirth and Stone (1956)	
									Brachycera															
									Tabanomorpha															
									Athericidae		X	X			X									Webb (1977)
									<i>Atherix</i>		X	X			X								Webb (1977)	
									<i>Atherix pachypus</i> Bigot, 1887		X	X			X								Three species known from the USA. <i>A. pachypus</i> is the name used for the western species	
									Pelecorhynchidae															
									<i>Bequaertomyia</i>	?	?			X	?	?							unknown biology; possibly not aquatic	
									<i>Glutops</i>		X	X			X	X	X							
									Stratiomyidae		X	X			X									
									<i>Caloparyphus</i>		X	X			X	X	X		X		Sinclair (1989)		early instars inseparable from <i>Euparyphus</i>	
									<i>Caloparyphus/Euparyphus</i>		X	X			X						Sinclair (1989)		use this name for all early instars of <i>Caloparyphus</i> and <i>Euparyphus</i>	

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									<i>Euparyphus</i>	X	X			X	X	X		X		Sinclair (1989)	spiracular stalk doesn't develop until final instar	
									<i>Hedriodus/Odontomyia</i>	X	X			X	X	X		X				
									<i>Myxosargus</i>	X	X			X				X				
									<i>Nemotelus</i>	X	X			X	X	X	X		X			
									<i>Stratiomys</i>	X	X			X	X	X						
														X						Courtney et al. (1996); Middlekauff and Lane (1980)	also many terrestrial genera	
									<i>Tabanidae</i>					X								
									<i>Apatolestes</i>	X	X			X	X	X		X	X			
									<i>Atylotus/Tabanus</i>	X	X			X	X	X		X			incompletely separable, except by habitat	
									<i>Chrysops</i>	X	X			X	X	X	X	X				
									<i>Haematopota</i>	X	X			X								
									<i>Hybomitra</i>	X	X			X	X	X		X				
									<i>Silvius</i>	X	X			X	X	X	X					
									<i>Asilomorpha</i>	X	X			X								
									<i>Dolichopodidae</i>	X	X			X	X	X	X	X			larvae and pupae should be identified to family	
									<i>Empididae</i>	X	X			X	X	X					only a few genera are aquatic	
									<i>Clinocerinae</i>	X	X			X		X						
									<i>Clinocera</i>	X	X			X		X						
									<i>Roderiodes</i>	X	X			X							feed on simuliid pupae	
									<i>Trichoclinocera</i>	X	X			?								
									<i>Wiedemannia</i>	X	X			?		X					feed on simuliid pupae	
									<i>Empidinae</i>	X	X			X	X	X						
									<i>Oreogeton</i>	X	X			X	X	X					feed on simuliid larvae	
									<i>Hemerodromiinae</i>	X	X			X	X	X						
									<i>Chelifera/Metachela</i>	X	X			X	X	X					MacDonald and Harkrider (1999)	
									<i>Hemerodromia</i>	X	X			X	X	X					larvae are inseparable at this time	
									<i>Neoplasta</i>	X	X			X	X	X					MacDonald and Harkrider (1999)	
									<i>Muscomorpha</i>													
									<i>Canacidae</i>					X								intertidal dwellers
									<i>Ephydriidae</i>	X	X	X		X	X	X	X	X	X	Courtney et al. (1996)	The key in Merritt and Cummins is	

Taxonomic Hierarchy									Habitat				Distribution							Literature Cited		Comments			
Order	Suborder	Infraorder	Family	Subfamily	Tribe	Genus group	Genus	Species group	Species	Benthic	Lotic	Lentic	Estuarine	CA	OR	WA	NV	AZ	Baja						
			Muscidae						X	X	X		X	X	X	X	X	X							
			Phoridae																						
			Sciomyzidae						X	X	X		X	X	X	X	X	X							
			Syrphidae						X	X	X		X	X	X	X	X	X							

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